Billing Code 4310–55–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R8–ES–2011–0105]

[4500030113]

Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List Humboldt Marten as an Endangered or Threatened Species

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of 12-month petition finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a 12-month finding on a petition to list the previously classified subspecies Humboldt marten (*Martes americana humboldtensis*), or the (now-recognized) subspecies of Humboldt marten

(*Martes caurina humboldtensis*), or the Humboldt marten distinct population segment (DPS) of the Pacific marten (*M. caurina*) as an endangered or threatened species under the Endangered Species Act of 1973, as amended (Act). The petition and this finding also address populations of marten from coastal Oregon, which recent genetic analyses indicate are likely to be the same entity as the current classification of Humboldt marten. We recognize a coastal DPS of the Pacific marten (which includes coastal Oregon populations of marten and the current classification of Humboldt marten) and find that this DPS is not warranted for listing at this time. However, we ask the public to submit to us any new information that becomes available concerning the stressors that may be impacting the coastal DPS of Pacific marten or its habitat at any time.

DATES: The finding announced in this document was made on [INSERT DATE OF FEDERAL REGISTER PUBLICATION].

ADDRESSES: This finding is available on the Internet at *http://www.regulations.gov* at Docket Number FWS–R8–ES–2011–0105. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, 1655 Heindon Road, Arcata, CA 95521. Please submit any new information, materials, comments, or questions concerning this finding to the above street address.

FOR FURTHER INFORMATION CONTACT: Bruce Bingham, Field Supervisor, U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office (see **ADDRESSES**); by

telephone at 707–822–7201; or by facsimile at 707–822–8411. If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Acronyms and Abbreviations Used in This Document

We use many acronyms and abbreviations throughout this 12-month finding. To assist the reader, we provide a list of these here for easy reference:

Act = Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.)

AR = Anticoagulant Rodenticides

BLM = Bureau of Land Management

CBD = Center for Biological Diversity

CDFG = California Department of Fish and Game (see below)

CDFW = California Department of Fish and Wildlife (formerly CDFG)

CDPR = California Department of Parks and Recreation

CESA = California Endangered Species Act

CEQA = California Environmental Quality Act

CFR = Code of Federal Regulations

DPS = Distinct Population Segment

EPIC = Environmental Protection Information Center

Forest Service = U.S. Forest Service

FR = Federal Register

GIS = Geographic Information System

HCP = Habitat Conservation Plan

HMCG = Humboldt Marten Conservation Group

IPCC = Intergovernmental Panel on Climate Change

IUCN = International Union for Conservation of Nature

LANDFIRE = Landscape Fire and Resource Management Planning Tools Project

LRMP = Land and Resource Management Plan

MDL = Multi-District Litigation

MOU = Memorandum of Understanding

MTBS = Monitoring Trends in Burn Severity

NMFS = National Marine Fisheries Service

NWFP = Northwest Forest Plan

OAR = Oregon Administrative Rules

ODF = Oregon Department of Forestry

RMP = Resource Management Plan

Service = U.S. Fish and Wildlife Service

SPR = Significant Portion of [a Species'] Range

USDA = U.S. Department of Agriculture

Background

Section 4(b)(3)(B) of the Act (16 U.S.C. 1531 *et seq*.) requires that, for any petition to revise the Federal Lists of Endangered and Threatened Wildlife and Plants that contains substantial scientific or commercial information suggesting that listing a species may be warranted, we make a finding within 12 months of the date of receipt of the petition. In this finding, we will determine that the petitioned action is: (1) Not warranted, (2) warranted, or (3) warranted, but the immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether species are endangered or threatened, and expeditious progress is being made to add or remove qualified species from the Federal Lists of Endangered and Threatened Wildlife and Plants ("warranted but precluded"). Section 4(b)(3)(C) of the Act requires that we treat a petition for which the requested action is found to be warranted but precluded as though resubmitted on the date of such finding, that is, requiring a subsequent finding to be made within 12 months. We must publish these 12-month findings in the **Federal Register**.

Previous Federal Actions

On September 28, 2010, we received a petition dated September 28, 2010, from the Center for Biological Diversity (CBD) and the Environmental Protection Information Center (EPIC), requesting that we consider for listing the (then-classified) subspecies Humboldt marten (*Martes americana humboldtensis*), or the (now-recognized) subspecies Humboldt marten (*M. caurina humboldtensis*), or the Humboldt marten DPS of the Pacific marten (*M. caurina*). The petitioners further stipulated that, based on

recent genetic analyses indicating that populations of marten from coastal Oregon (considered members of *M. a. caurina*) are more closely related to *M. a. humboldtensis* than to *M. a. caurina* in the Cascades of Oregon (citing Dawson 2008, Slauson *et al.* 2009a), the range of the subspecies or DPS of the Humboldt marten should be expanded to include coastal Oregon populations of martens. In a letter to the petitioners dated October 22, 2010, we responded that we reviewed the information presented in the petition and determined that issuing an emergency regulation temporarily listing the species under section 4(b)(7) of the Act was not warranted.

On January 12, 2012, we published in the **Federal Register** a 90-day finding (77 FR 1900) that the petition presented substantial information indicating that listing may be warranted and that initiated a status review. For purposes of the 90-day finding, the common name Humboldt marten referred to the then-classified American marten (*M. americana*) populations in coastal northern California and coastal Oregon.

On June 23, 2014, we published a scoping notice in the **Federal Register** (79 FR 35509) that summarized the uncertainty regarding the taxonomic classification of the subspecies (based on current genetics information) and indicated our intent to conduct an evaluation (for the 12-month finding) of a potential DPS of martens in coastal northern California and coastal Oregon relative to the full species classification level.

According to section 3(16) of the Act, we may consider for listing any of three categories of vertebrate animals: A species, subspecies, or DPS (see the Service's 1996

DPS Policy at 61 FR 4722). We refer to each of these categories as a potential "listable entity." We evaluated three possible listable entities for this 12-month finding based upon the best available published and unpublished information for martens in coastal northern California and coastal Oregon (for further details, please see the *Current Taxonomic Description* and *Listable Entity Evaluation and Distinct Population Segment Analysis* sections, below):

- Subspecies Humboldt marten (*Martes americana humboldtensis*): This entity was considered not reasonable for evaluation because its species-level name is no longer considered valid. Specifically, Dawson and Cook (2012, entire) split the then-classified American marten (*M. americana*) to recognize the Pacific marten (*M. caurina*) for all martens occurring west of the Rocky Mountain crest.
- Subspecies Humboldt marten (*Martes caurina humboldtensis*): This entity was considered not reasonable for evaluation because its description is (currently) specifically linked with the extant population that resides in coastal northern California and does not include the coastal Oregon populations, which the best available genetics data indicate are likely the same entity.
- DPS of the Pacific marten (*Martes caurina*): We considered it reasonable that a DPS of the Pacific marten constitute the listable entity for our status review based on our evaluations of the best scientific and commercial data currently available (including unpublished genetics information), and our consideration of the Service's February 7, 1996, Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act (DPS Policy; 61 FR 4722). As such, we considered in the scoping notice (79 FR 35509; June

23, 2014) that the DPS include the currently recognized *M. caurina humboldtensis* (i.e., Humboldt marten) and the coastal populations of *M. caurina caurina* in Oregon (i.e., Oregon Coast Range group). We solicited information regarding our consideration of the coastal northern California and coastal Oregon populations of Pacific marten as a single listable entity. See *Listable Entity Evaluation and Distinct Population Segment Analysis*, below, for additional discussion related to our decision that a coastal DPS of the Pacific marten (hereafter referred to as "coastal marten") constitutes the listable entity for this status review.

This notice constitutes the 12-month finding on the September 28, 2010, petition to list the (then-classified) subspecies Humboldt marten (*Martes americana humboldtensis*), or the (now-recognized) subspecies Humboldt marten (*M. caurina humboldtensis*), or the Humboldt marten DPS of the Pacific marten (*M. caurina*) as an endangered or threatened species.

This finding is based upon the Species Report titled "Coastal Oregon and Northern Coastal California populations of the Pacific marten (*Martes caurina*)" (Service, 2015) (Species Report), a scientific analysis of available information prepared by a team of Service biologists from the Service's Arcata Fish and Wildlife Office, Oregon Fish and Wildlife Office, Pacific Southwest Regional Office, Pacific Regional Office, and National Headquarters Office. The purpose of the Species Report is to provide the best available scientific and commercial information about the species so that

we can evaluate whether or not the species warrants protection under the Act. In it, we compiled the best scientific and commercial data available concerning the status of the coastal Oregon and northern coastal California populations of Pacific marten, including past, present, and future threats to these populations. As such, the Species Report, including the appendix, provides the scientific basis that informs our regulatory decision in this document, which involves the further application of standards within the Act and its regulations and policies. The Species Report can be found on the Internet at *http://www.regulations.gov*, Docket No. FWS–R8–ES–2011–0105.

Current Taxonomic Description

The American marten (*Martes americana*) was originally described as a single species by Turton (1806, entire), based on specimens from eastern North America. In 1890, Merriam (1890, entire) considered a new species, *Mustela* [=*Martes*] *caurina*, to be those martens found west of the Rocky Mountains. In 1926, the Humboldt [Pine] marten (*M. c. humboldtensis*) was described as a subspecies of *Martes caurina* (Grinnell and Dixon 1926, entire); historically, this subspecies was distributed throughout the coastal, fog-influenced coniferous forests of northern California from northwestern Sonoma County north to the Oregon border (Grinnell and Dixon 1926, entire). In 1953, Wright (1953, entire) described one species, the American marten (*M. americana*), which included as subspecies both the Humboldt [Pine] marten subspecies (*M. a. humboldtensis*), and the former western marten species (*M. caurina*), classified as *M. a. caurina*.

As noted above, at the time of our 90-day finding (77 FR 1900; January 12, 2012), the Humboldt marten was classified as *Martes americana humboldtensis*. Subsequently, Dawson and Cook (2012, entire) split the American marten, recognizing the Pacific marten (*M. caurina*) for all martens occurring west of the Rocky Mountain crest, based on genetic and morphological differences. Currently, the classification of the Humboldt marten in coastal northern California is *M. c. humboldtensis*, and the marten populations occurring in adjacent coastal Oregon are *M. c. caurina*. In addition, as currently recognized, populations of martens in the Oregon Cascades northward through the State of Washington and into British Columbia, Canada, are also *M. c. caurina*.

Ongoing genetic research indicates uncertainty in the currently accepted Pacific marten subspecies delineations in California and Oregon. Specifically, the best available data indicate that the *Martes caurina humboldtensis* population in coastal northern California (Humboldt, Siskiyou, and Del Norte Counties) and the two known *M. c. caurina* populations in coastal Oregon (Curry, Coos, coastal portion of Douglas, coastal portion of Lane, Lincoln, and Tillamook Counties) are likely a single evolutionary unit (clade) (Slauson *et al.* 2009a, p. 1,340; Schwartz and Slauson 2015, pers. comm.) (as noted in the scoping notice that published in the **Federal Register** on June 23, 2014 (79 FR 35509), and was made available for review at *http://www.regulations.gov*, Docket No. FWS–R8–ES–2014–0023). Although questions regarding the taxonomy of marten subspecies in northern California and Oregon are not new (i.e., both the petition we received (CBD and EPIC 2010) and our 90-day finding (January 12, 2012; 77 FR 1900)

identified ongoing genetic research and taxonomic uncertainty), the best available information indicate that the original designation of two separate marten subspecies occurring in coastal northern California and coastal Oregon is likely invalid (Schwartz and Slauson 2015, pers. comm.).

Listable Entity Evaluation and Distinct Population Segment Analysis

Based on the September 28, 2010, petition, and information received both prior and subsequent to our June 23, 2014, scoping notice regarding the listable entity, we considered whether the potential coastal DPS of Pacific marten meets the definition of a DPS as described in the Service's DPS Policy (61 FR 4722; February 7, 1996).

Section 3(16) of the Act defines the term "species" to include "… any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." We have always understood the phrase "interbreeds when mature" to mean that a DPS must consist of members of the same species or subspecies in the wild that would be biologically capable of interbreeding if given the opportunity, but all members need not actually interbreed with each other. A DPS is a subset of a species or subspecies, and cannot consist of members of a different species or subspecies. The "biological species concept" defines species according to a group of organisms, their actual or potential ability to interbreed, and their relative reproductive isolation from other organisms. This concept is a widely accepted approach to defining species. The Act's use of the phrase "interbreeds when mature"

reflects this understanding. Use of this phrase with respect to a DPS is simply intended to mean that a DPS must be comprised of members of the same species or subspecies. As long as this requirement is met, a DPS may include multiple populations of vertebrate organisms even if they may not actually interbreed with each other. For example, a DPS may consist of multiple populations of a fish species separated into different drainages. While these populations may not actually interbreed with each other, their members are biologically capable of interbreeding.

The National Marine Fisheries Service (NMFS) and the Service published a joint Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act (DPS Policy on February 7, 1996 (61 FR 4722). According to the DPS Policy, two elements must be satisfied in order for a population segment to qualify as a possible DPS: discreteness and significance. If the population segment qualifies as a DPS, the conservation status of that DPS is then evaluated to determine whether it is endangered or threatened.

A population segment of a vertebrate species may be considered discrete if it satisfies either one of the following conditions: (1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors; or (2) it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.

If a population is found to be discrete, then it is evaluated for significance under the DPS Policy on the basis of its importance to the taxon to which it belongs. This consideration may include, but is not limited to, the following: (1) Persistence of the discrete population segment in an ecological setting unusual or unique to the taxon; (2) evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon; (3) evidence that the population represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside of its historical range; or (4) evidence that the population differs markedly from other populations of the species in its genetic characteristics.

If a population segment is both discrete and significant (i.e., it qualifies as a potential DPS), its evaluation for endangered or threatened status is based on the Act's definitions of those terms and a review of the factors listed in section 4(a) of the Act. According to our DPS Policy, it may be appropriate to assign different listing classifications to different DPSs of the same vertebrate taxon.

We were petitioned to list collectively two groups of the Pacific marten (two populations in Oregon and one in California) that are currently recognized as belonging to two separate subspecies (as described above). To ensure that we evaluated the most accurate listable entity based on the best scientific and commercial data currently available (including unpublished genetics information), we published a scoping notice in the **Federal Register** on June 23, 2014 (79 FR 35509), notifying the public that we

considered it reasonable that a coastal DPS of the Pacific marten constitute the listable entity for our status review.

We received eight comment letters from six entities in response to our June 23, 2014, scoping notice. Four entities agreed with our proposed DPS, one was silent, and one disagreed with our evaluation of a coastal DPS of the Pacific marten as the listable entity; two entities commented twice reiterating their same positions. The commenter who disagreed with the proposed coastal DPS of the Pacific marten as the listable entity believed more information, including genetics, would be required and that the entity we proposed would not be a valid DPS according to Service criteria. Following publication of the scoping notice in the **Federal Register**, we received more genetics information (Schwartz and Slauson 2015, pers. comm.) that supports our consideration of a coastal DPS of the Pacific marten.

After taking into consideration the comments received and conducting further evaluation of the best available scientific and commercial information (including additional genetics information), we confirm here that this DPS is a listable entity, including the currently recognized *Martes caurina humboldtensis* (i.e., Humboldt marten) and the coastal populations of *M. caurina caurina* in Oregon (i.e., Oregon Coast Range group). This entity is reasonable given:

(1) The best available data (e.g., new genetics information, similar habitat usage) suggest that the coastal northern California marten population and the coastal Oregon marten populations represent a single evolutionary entity as opposed to two separate

entities (Schwartz *et al.*, In prep.). In particular, Schwartz *et al.* (In prep.) has provided substantive information (with both mitochondrial and nuclear DNA evaluations) that the marten populations occurring in coastal northern California and coastal Oregon are unique and more closely related to each other than to other groups/populations of Pacific martens, to the extent that they are diagnosably distinct from all other Pacific martens.

(2) Existing genetics information (Slauson *et al.* 2009a, entire) suggests that subspecies-level taxonomy of *M. c. humboldtensis*, *M. c. caurina*, and possibly other subspecies of the Pacific marten as currently classified may be inaccurate.

(3) The DPS Policy (February 7, 1996; 61 FR 4722) states that the population segment under consideration must be evaluated for discreteness and significance in relation to the remainder of the taxon to which it belongs. Ordinarily, in the present case we would evaluate the marten populations relative to the subspecies to which they belong, but the populations in question currently represent two separate subspecies and there is uncertainty as to the legitimacy of those subspecies classifications, rendering such an evaluation invalid.

(4) Uncertainty in the subspecies-level taxonomy of Pacific marten logically necessitates that we elevate our evaluation of the DPS relative to the Pacific marten at the full species level. In other words, we apply the criteria for evaluating a coastal DPS of the Pacific marten relative to the full species Pacific marten (*Martes caurina*) as a whole.

(5) The DPS Policy (February 7, 1996; 61 FR 4722) states that "In all cases, the organisms in a population are members of a single species or lesser taxon." Therefore, given (1) through (4) above, an evaluation at the species level is appropriate. Consequently, for purposes of this Finding, below we evaluate the Pacific marten

populations that occur in coastal Oregon and coastal northern California under our DPS Policy.

For this 12-month finding and DPS analysis of the Pacific marten populations that occur in coastal Oregon and coastal northern California, we reviewed and evaluated all available published and unpublished information, including numerous publications, reports, and other data submitted by the public. Marten distribution in coastal northern California and coastal Oregon is discussed in detail in the "Species Distribution" section of the Species Report titled "Coastal Oregon and Northern Coastal California populations of the Pacific marten (*Martes caurina*)" (Service 2015, pp. 28–32), which is available on the Internet at *http://www.regulations.gov*, Docket No. FWS–R8–ES–2011–0105.

Discreteness

Under the DPS Policy, a population segment of a vertebrate taxon may be considered discrete if it satisfies either one of the following conditions:

(1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation.

(2) It is delimited by international governmental boundaries within which

differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act. As the marten populations in question here do not transcend an international boundary, this criterion does not apply.

As described below, the Pacific marten populations that occur in coastal Oregon and coastal northern California are markedly separated from other Pacific marten populations by geographical isolation (i.e., separated by areas of unsuitable habitat), and marked genetic differences between those coastal populations (coastal Oregon and coastal northern California) and other populations of Pacific marten are evidence of this long-standing separation. The extant population in coastal northern California is separated from the Sierra marten subspecies (*Martes caurina sierrae*) by unsuitable habitat to the east in the Klamath River canyon. The coastal central Oregon extant population is separated from Pacific marten populations to the east (in the Oregon Cascade Mountains) primarily by unsuitable habitat within the Willamette Valley. Although some suitable habitat occurs between the coastal southern Oregon extant population area and the southern Cascades population of Pacific martens to the east, the distance to large blocks of suitable habitat in the southern Cascade mountains far exceeds the mean maximum dispersal distance for martens (see discussion below). Additionally, martens that occur in coastal Oregon and coastal northern California occur in areas without significant, persistent snowpack (Slauson 2003, p. 66; Slauson *et al.*, In prep.). Mountain ranges to the east that have both unsuitable marten habitat and are covered by significant, persistent snowpack stand between the coastal Oregon and coastal northern

California populations of Pacific martens and other Pacific marten populations (e.g., separation of Humboldt and Sierra Nevada populations), thereby effectively isolating the coastal marten populations from other Pacific martens. East-west movements that would potentially connect Pacific marten populations in coastal Oregon and coastal northern California with inland Pacific marten populations are likely rare because:

(1) Most juvenile marten dispersal distances (that are published in literature) in both logged and unlogged forests range from less than or equal to 5 km (3.1 mi) (Broquet *et al.* 2006, p. 1,694) to approximately 15 km (9.3 mi) (Phillips 1994, pp. 93–94; Pauli *et al.* 2012, p. 393). The distance between the coastal Oregon and coastal northern California populations of Pacific martens and other Pacific marten populations to the east exceeds the likely maximum dispersal distance.

(2) Pacific martens within the three extant populations in coastal Oregon and coastal northern California likely only need to disperse short distances to establish a home range because there are typically sufficient amounts of unoccupied suitable habitat available within their natal area.

(3) Large patches of unsuitable habitat on the eastern edge of the historical range in this region would likely deter juvenile martens from moving east. As described below in the section *Summary of Species Information*, the coastal Oregon and coastal northern California populations of Pacific martens require a dense shrub understory comprised of shade-tolerant shrub species within the conifer-dominated overstory that they occupy (Zielinski *et al.* 2001, p. 485; Slauson *et al.* 2007, p. 464), and in coastal Oregon and coastal northern California, this dense shrub layer generally does not occur outside of the coastal fog-influenced areas. Thus, martens in coastal northern California and coastal

Oregon are functionally isolated from other marten populations by their dependence on the dense shrub layer found in the coastal coniferous forests of this region.

The coastal Oregon and coastal northern California populations of Pacific martens are also markedly separated from other populations of the Pacific marten as evidenced by quantitative measures of genetic discontinuity. The Humboldt marten was historically distributed throughout the coastal coniferous forests of northern California from northwestern Sonoma County northward to the Oregon border (Grinnell *et al.* 1937, pp. 207–210). Recent phylogenetic analyses using mitochondrial DNA (mtDNA) support the distinctiveness of the Humboldt marten subspecies, based on the presence of distinct haplotypes shared by historical museum specimens and martens currently occupying portions of the historical range in northern coastal California (Slauson *et al.* 2009a, entire). Marten populations in coastal Oregon, which were historically described as *M. c. caurina*, also share these haplotypes, leading Slauson *et al.* (2009a, pp. 1338–1339) to suggest that martens in the Coast Range of Oregon may also be *M. c. humboldtensis.* Furthermore, preliminary results of a subspecific genetic evaluation of the Pacific marten by Schwartz *et al.* (In prep.)—using nuclear DNA (nDNA) and samples from substantially more martens than used by Slauson *et al.* (2009a)—demonstrate that the coastal Oregon and coastal northern California populations of Pacific martens are clearly distinguishable from other populations of Pacific marten on the basis of their genetic characteristics. Schwartz *et al.* (In prep.) indicate that coastal Oregon and northern coastal California marten populations represent a single evolutionary clade, calling into question the separation of the original subspecies range boundaries (i.e., *M. c.*

humboldtensis in northern coastal California and *M. c. caurina* in coastal Oregon) at the California-Oregon border. Although some low degree of introgression indicates occasional past movement of individuals between coastal and inland populations, the evidence suggests this was an infrequent occurrence (Schwartz *et al.*, In prep.); thus, the coastal Oregon and coastal northern California populations of Pacific martens are effectively genetically discrete from other populations of Pacific marten.

In summary, the best available information indicates that Pacific marten populations in coastal Oregon and coastal northern California are geographically isolated and genetically discrete from all other populations of the Pacific marten. Therefore, the marked separation condition for discreteness under our DPS Policy is met.

Significance

If a population segment is considered discrete under one or more of the conditions described in the Service's DPS Policy, its biological and ecological significance will be considered in light of Congressional guidance that the authority to list DPSs be used "sparingly" (see Senate Report 151, 96th Congress, 1st Session) while encouraging the conservation of genetic diversity. In making this determination, we consider available scientific evidence of the DPS's importance to the taxon to which it belongs.

Because precise circumstances are likely to vary considerably from case to case, the DPS Policy does not describe all the classes of information that might be used in

determining the biological and ecological importance of a discrete population. However, the DPS Policy describes four possible classes of information that provide evidence of a population segment's biological and ecological importance (significance) to the taxon to which it belongs. This consideration of the population segment's significance may include, but is not limited to, the following:

(1) Persistence of the discrete population segment in an ecological setting unusual or unique to the taxon;

(2) Evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon;

(3) Evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historical range; or

(4) Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

To be considered significant, a population segment needs to satisfy only one of these conditions. Other classes of information that might bear on the biological and ecological importance of a discrete population segment may also be used as appropriate, to provide evidence for significance, as described in the DPS Policy (61 FR 4722; February 7, 1996). At least two of the significance criteria are met for the marten populations in coastal Oregon and coastal northern California. First, we find that populations of Pacific martens in coastal Oregon and coastal northern California differ markedly from other populations of the Pacific marten species in their genetic

characteristics. As described above under "Discreteness," the coastal Oregon and coastal northern California populations of Pacific martens are genetically distinct from all other populations of Pacific martens (Schwartz *et al.*, In prep.). As a result, loss of the marten populations from coastal Oregon and coastal northern California would result in a reduction in Pacific marten genetic diversity. Second, we find that the loss of martens from coastal Oregon and coastal northern California would result in a significant gap in the range for the Pacific marten. The coastal populations of martens in California and Oregon represent the only coastal populations of Pacific martens in these States and inhabit a habitat association unique from other non-coastal marten populations—that is, areas consisting of occasional, non-persistent snowpack (below 914 meters (m) (3,000 feet (ft)) with a mesic, shade-tolerant shrub layer (understory) within coastal coniferous forest habitat (see "Life History" section of the Species Report). The requirement of this dense (greater than 70 percent cover), shrubby understory is particularly unusual for martens, and is a unique habitat association not described elsewhere in the distribution of either Pacific martens or American martens in North America (Slauson *et al.*, In prep.(a)). The coastal Oregon and coastal northern California populations of Pacific martens are also the only martens known to utilize coastal serpentine habitat and dune forest habitat distributed on coastal terraces. These genetic differences and the evidence that a significant gap in the range of the taxon would result from the loss of the discrete population segment both individually satisfy the significance criterion of the DPS Policy. Therefore, under the Service's DPS Policy, we find that the populations of Pacific martens in coastal Oregon and coastal northern California are significant to the taxon to which they belong.

Conclusion of DPS Analysis Regarding Pacific Martens in Coastal Oregon and Coastal Northern California

As stated above under *Current Taxonomic Description*, the best available scientific and commercial information suggests that the coastal Oregon populations of Pacific marten (*Martes caurina caurina*) are likely the same entity as the currently classified Humboldt marten (*M. c. humboldtensis*). We find that the coastal Oregon and coastal northern California populations of Pacific martens collectively constitute a valid DPS under the Service's DPS Policy because this population segment is both discrete and significant to the taxon to which it belongs. We therefore consider the coastal Oregon and coastal northern California populations of Pacific martens collectively as the "coastal DPS of the Pacific marten," which constitutes the listable entity for this status review. Throughout this document when we use the term "coastal marten," we are using this term as shorthand for the coastal DPS of the Pacific marten.

Summary of Species Information

A thorough review of the taxonomy, life history, biophysical environment, habitat use, distributions, and population abundance/trends of the coastal DPS of Pacific marten is presented in the Species Report (Service 2015, pp. 1–40) available on the Internet at *http://www.regulations.gov*, Docket No. FWS–R8–ES–2011–0105). A summary of this information is presented below. We used data specific to coastal marten populations

when they were available; when such information was lacking, we relied on information regarding North American martens in general (American or Pacific martens), and have made these distinctions in the text that follows.

Life History

Two species of marten, divided into 14 total subspecies, inhabit North America. Collectively, North American martens are characterized by the long and narrow body type typical of the mustelid family (Mustelidae; e.g., weasels, minks, otters and fishers), overall brown pelage (fur) with distinctive coloration on the throat and upper chest that varies from orange to yellow to cream, large and distinctly triangular ears, and a bushy tail that is proportionally equivalent to about 75 percent of the body length (Clark *et al.* 1987, p. 2; Powell *et al.* 2003, p. 636).

Marten activity patterns coincide with their prey species availability. Specifically, martens are active year-round and seasonally adjust their activity patterns to synchronize with those of their key prey species (Zielinski *et al.* 1983, pp. 387–388). Overall, the diet of North American marten species is dominated by mammals, but birds, insects, and fruits are seasonally important (Martin 1994, pp. 298–301). Diet analysis for the coastal marten is currently limited to scats collected from the coastal northern California population during summer and fall, and includes mammals, berries, birds, and reptiles (Slauson and Zielinski, In prep.). Sciurid (members of the squirrel family) and cricetid rodents (i.e., New World rats and mice) dominate the coastal marten's diet, with the most

frequent prey species being chipmunks (*Tamias* spp.) and red-backed voles (*Myodes californicus*), and, to a lesser extent, Douglas squirrels (*Tamiasciurus douglasii*) and flying squirrels (*Glaucomys sabrinus*) (Slauson and Zielinski, In prep.).

Information on coastal marten reproduction and survivorship is lacking; therefore our analysis is based on knowledge of North American martens in general, which are polygamous mammals. Female martens mate no sooner than 15 months of age and first litters are produced no sooner than 24 months of age (Strickland *et al.* 1982, p. 601). Mating occurs from late June to early August (Markley and Bassett 1942, pp. 606–607), and females give birth in March and April (Strickland *et al.* 1982, p. 602). Female martens are capable of producing from one to five kits per litter, but the modal average is two to three (Strickland and Douglas 1987, p. 602; Mead 1994, p. 410). Information is not available on the average number of young raised to weaning, the average number of young recruited into the population per female, or the effects of annual variation in environmental conditions and prey populations on kit survival. Regarding longevity, captive Pacific martens are known to reach 15 years of age (Clark *et al.* 1987, p. 3); however, data from American marten individuals in the wild in the Algonquin Region of Ontario, Canada, indicate that 10 percent (of 2,076 females trapped) were more than 5 years old (Strickland and Douglas 1987, p. 535). Finally, age structure of coastal martens has not been studied, although the best available information from an untrapped population of Pacific martens in the Sierra Nevada mountains indicates relatively consistent proportions of yearling and adult age classes (Slauson *et al.*, In prep.(a)).

Juvenile dispersal of the American marten is generally thought to occur as early as August, although fall, winter, and spring (the year after birth) dispersal periods have been reported (Clark and Campbell 1976, p. 294; Slough 1989, p. 993). Juvenile dispersal in coastal northern California and Sierra Nevada martens has been observed to occur as early as August and continues at least until the following summer season (Slauson and Zielinski 2014, unpubl. data). Information is not available regarding the timing of juvenile dispersal for coastal martens in Oregon. Pauli *et al.* (2012, p. 393) found that Pacific and American martens exhibit similar dispersal distances, averaging 15.5 km (9 mi). Most studies find that the majority of juvenile martens disperse relatively short distances to establish home ranges, ranging from less than or equal to 5 km (3.1 mi) (Broquet *et al.* 2006, p. 1,694) to approximately 15 km (9.3 mi) (Phillips 1994, pp. 9394; Pauli *et al.* 2012, p. 393). However, Broquet *et al.* (2006, p. 1695) also describe juvenile martens as capable of covering long distances during dispersal, up to 82 km (50 mi) in their study. Other researchers have reported instances of dispersal movements by martens ranging from 40 to 80 km (25 to 50 mi) (Thompson and Colgan 1987, pp. 831–832; Fecske and Jenks 2002, p. 310), up to 149 km (93 mi) or even 160 km (100 mi) in distance (Slough 1989, p. 993; Kyle and Strobeck 2003, p. 61). Based on minimal genetic structuring of marten populations in a heavily harvested forest landscape, Kyle and Strobeck (2003, pp. 60–61) suggested that habitat fragmentation may not necessarily impede marten movement to the degree formerly understood. However, Kyle and Strobeck (2003, p. 65) also caution that smaller scale disturbances may still act as partial barriers to marten gene flow. Johnson (2008, pp. 33–36) found that juvenile martens traveled slower, shorter distances, and suffered twice the mortality

risk in logged versus unlogged landscapes. Therefore, the best available information suggest that landscape condition (e.g., the spatial distribution of unlogged and logged stands) has important effects on dispersal dynamics, affecting both the distance dispersers can travel and the success rate they have in establishing home ranges and surviving to adulthood.

Intraguild predation and interspecific competition occurs naturally within the range of the coastal DPS of Pacific marten. Intraguild predation refers to killing and eating of potential competitors that utilize the same prey resources. Interspecific competition is a form of competition in which individuals of a different species compete for the same resource in an ecosystem (as opposed to intraspecific competition that involves organisms of the same species). Martens are susceptible to predation by larger mammalian and avian predators, typically habitat-generalist species, including coyote (*Canis latrans*), red fox (*Vulpes vulpes*), bobcat (*Felis rufus*), fishers (*Pekania pennanti*), and great horned owl (*Bubo virginianus*) (Thompson 1994, p. 276; Lindstrom *et al.* 1995, entire; Bull and Heater 2001, p. 4; McCann *et al.* 2010, p. 11). Marten predators may vary depending on the quality of the habitat. For example, American marten populations in highly altered forest landscapes show higher rates of predation by habitat generalist carnivores (and lower annual survival rates) than those in less-altered forest landscapes (Thompson 1994, p. 278)). Because marten populations are strongly influenced by adult and juvenile survivorship (Buskirk *et al.* 2012, p. 89), predation of martens can have a meaningful effect on abundance and population growth rates. Additional discussion on predation as a stressor on the coastal marten is provided below in **Summary of**

Information Pertaining to the Five Factors.

Habitat Description

The preferred habitat type for the coastal DPS of Pacific marten occurs in some of the most productive forests in the world. In unmanaged, late-seral stages, these forests are typically composed of long-lived, large trees, with multi-layered canopy structure, substantial large woody debris (standing and downed), and abundant ferns, herbs, and shrubs on the forest floor (Sawyer *et al.* 2000, entire; Chappell *et al.* 2001, entire; Sawyer 2007, entire; DellaSala *et al.* 2011, entire). The forests are largely coniferous and typically dominated by coast Douglas-fir (*Pseudotsuga menziesii menziesii*), western hemlock (*Tsuga heterophylla*), and Sitka spruce (*Picea sitchensis*) in Oregon, and redwood (*Sequoia sempervirens*) and coast Douglas-fir in California (Ricketts *et al.* 1999, entire; Sawyer 2007, entire). Higher elevation areas also include sub-dominant conifers such as western redcedar (*Thuja plicata*), Port Orford-cedar (*Chamaecyparis lawsoniana*), grand fir (*Abies grandis*), sugar pine (*Pinus lambertiana*), and white fir (*Abies concolor*) (Chappell *et al.* 2001, entire; Sawyer 2007, entire). Hardwood-dominated stands are uncommon, although hardwood species such as tanoak (*Notholithocarpus densiflorus*), golden chinquapin (*Chrysolepis chrysophylla*), and Pacific madrone (*Arbutus menziesii*) are common canopy subdominants. Red alder (*Alnus rubra*) can occur as an early successional overstory dominant in the uplands in some near-coast locations or post-logging sites. Riparian forests are dominated by broadleaf species such as red alder, black cottonwood (*Populus trichocarpa*), bigleaf

maple (*Acer macrophyllum*), and mesic shrub species such as vine maple (*A. circinatum*).

A dense understory of shrubs and herbaceous plants are a key habitat requirement for the coastal marten (see "Habitat Use" section of the Species Report (Service 2015, pp. 18–27)). Species presence and dominance is shaped largely by the combination of soil nutrients and moisture, with herbaceous species such as sword fern (*Polystichum munitum*) dominating on nitrogen rich or very moist sites, and evergreen shrubs such as Pacific rhododendron (*Rhododendron macrophyllum*) and salal or wintergreen (*Gaultheria* sp.) dominating on nutrient poor or drier sites (Chappell and Kagan 2001, entire). Other dominant or co-dominant understory shrub species include evergreen huckleberry (*Vaccinium ovatum*), salmonberry (*Rubus spectabilis*), red huckleberry (*Vaccinium parvifolium*), and in serpentine habitats (see description below) dwarf tanbark (*Notholithocarpus densiflorus* var. *echinoides*) and huckleberry oak (*Quercus vaccinifolia*) (Jimerson *et al.* 1996, pp. A13–A15; Sawyer *et al.* 2000, entire; Chappell *et al.* 2001, entire). Many of the dominant shrub species are adapted to fire by having lignotubers, which are basal swellings at the interface between the roots and shoots usually just below the soil surface, allowing these species to quickly sprout after fire kills the shoots and thus maintain site dominance (Agee 1993, p. 133).

Two additional, rare forest habitats are of particular relevance to coastal martens: coastal serpentine and coastal dune forest. Forests in serpentine habitats are typically open and rocky with stunted trees that contrast sharply with the dense, rapidly-growing stands on more productive, non-serpentine soils that surround these sites (Jimerson *et al.*

1995, pp. A8–A31). Martens are not known to occupy these more open, drier, interior areas. However, on the extreme coastal edge of the serpentine habitats that occur in coastal northern California and coastal Oregon, increased moisture and summer fog supports dense, spatially-extensive shrub layers; coastal martens have been found in this wetter variant of coastal serpentine habitat in both Oregon and California. The serpentine communities used by coastal martens are composed of a variety of coniferous trees, such as Douglas-fir, sugar pine, lodgepole pine (*Pinus contorta*), western white pine (*P. monticola*), Jeffrey pine (*P. jeffreyi*), knobcone pine (*P. attenuatta*), and Port Orford-cedar, and are dominated by mast-producing shrubs such as dwarf tanbark, huckleberry oak, and red huckleberry (Jimerson *et al.* 1995, p. C1; Slauson 2003, pp. 5, 9, 13). The coastal dune forest communities where coastal martens have been found are predominantly in coastal Oregon and are typically dominated by shore pine (*P. contorta contorta*), the coastal form of lodgepole pine, and in some areas co-dominated by Sitka spruce occurring in stabilized dunes on marine terraces. Although martens have been found in these less-common habitat types, it is important to note that the more extensive dominant forest types (i.e., coastal coniferous forests) support the majority of the historical marten distribution in coastal Oregon and coastal northern California.

Coastal martens select habitat at four primary spatial scales: micro-scale (resting and denning structures), stand-scale, home range, and landscape-scale (facilitating movement, occupancy, and population dynamics).

(1) Micro-scale—Rest structures are used daily by martens between foraging

bouts to provide thermoregulatory benefits and protection from predators (Taylor and Buskirk 1994, pp. 253–255). Reuse rates for individual rest structures are low and selection for structure type changes seasonally to meet thermoregulatory needs (e.g., Spencer 1987), such that multiple resting structures meeting seasonal requirements are required across the home range. Large-diameter live trees, snags, and logs provide the main types of resting structures for martens (Spencer *et al.* 1983, pp. 1182–1185; Schumacher 1999, pp. 26–58; Slauson and Zielinski 2009, pp. 41–42). Denning structures used by female martens to give birth to kits are called natal dens, and the subsequent locations where they move their kits are referred to as maternal dens. Ruggiero *et al.* (1998, pp. 665–669) found that both the characteristics of the den structures and the characteristics of the stands in which they were found influenced den-site selection. This is likely due to the importance of high-quality foraging habitat in close proximity to den sites, allowing females to simultaneously maximize the energy they gain from foraging during lactation and minimize the time spent away from kits, especially when they are dependent on their mothers for thermoregulation. The most common den structures used by Pacific and American martens are large-diameter, live and dead trees with cavities (Thompson *et al.* 2012, p. 223).

(2) Stand-scale—Martens select forest stands that provide habitat structure supporting one or more life history needs that include foraging, resting, or denning. Coastal martens in California most strongly selected stands of old-growth, conifer-dominated forests with dense shrub layers (Slauson *et al.* 2007, pp. 464–465). Other than the late-mature developmental stage, which was used in proportion to its availability,

stands in earlier developmental stages were selected against (Slauson *et al.* 2007, pp. 462–464). These old-growth and late-mature stands most often were dominated by Douglas-fir overstory, but also had mature hardwood understories composed of either tanoak or golden chinquapin. Shrub layers were dense (greater than 70 percent cover), spatially extensive, and dominated by evergreen huckleberry, salal, and rhododendron (Slauson *et al.* 2007, p. 465). The majority of detections of martens in coastal southern Oregon share these same stand characteristics (Zielinski *et al.* 2001, p. 485).

(3) Home Range—Pacific and American martens exhibit strong habitat selection at the home range scale, suggesting that this scale of selection most directly influences an individual's fitness (Thompson *et al.* 2012, p. 210). Martens establish home ranges to encompass their year-round resource needs and, during the breeding season, gain access to members of the opposite sex. Marten home ranges are often positioned to maximize high-quality habitat (typically greater than 70 percent high-quality, late-successional forest (reviewed in Thompson *et al.* 2012, p. 218)) and to minimize low-quality habitat (e.g., recent clear cuts, partial harvest) (Phillips 1994, pp. 59–60). Females, due to their solitary role raising young, have unique needs that require access to suitable den sites located near reliable and nearby prey resources to support the energetic demands of lactation and providing food for kits. In coastal northern California, Slauson and Zielinski (2014, unpubl. data) found 97 percent (38 of 39) of the female within-home-range resting and active locations occurred in the core old-growth and late-mature riparian habitat patches. In comparison, 77 percent (30 of 39) of the male within-home-range resting and active locations occurred in the core old-growth and late-mature

riparian habitat patches (Slauson and Zielinski 2014, unpubl. data). Also of note is that there is an inverse relationship between the amount of high-quality habitat and marten home range size (i.e., as the amount of high-quality habitat decreases, home range size increases) (Thompson 1994, p. 276; Potvin and Breton 1997, p. 462; Fuller and Harrison 2005, pp. 715–719).

(4) Landscape-scale—The pattern and composition of habitat at this scale affects: (a) The ability of martens to successfully disperse and find suitable home ranges; (b) survival and species occurrence over time and space; and (c) ultimately, population size and persistence. Successful dispersal requires the existence of functional habitat connectivity between patches of habitat suitable for reproduction to maintain or expand population size and distribution. Also, during dispersal, martens use a search strategy that is not random or linear, suggesting they are responding to habitat cues and that landscape pattern likely influences movement trajectories (Johnson 2008, pp. 27–29, 36–39). Compared to other species closely associated with late-successional forest, American and Pacific marten populations, including the coastal marten, are sensitive to the loss or fragmentation of high-quality habitat at the landscape scale. For example, martens exhibit a progression of responses to timber harvest as the proportion of habitat affected by intensive logging activities increases. Such activities include, but are not limited to, clear cutting (see review in Thompson *et al.* 2012), partial harvest (Potvin *et al.* 2000, pp. 851–854; Fuller and Harrison 2005, pp. 715–716; Godbout and Ouellet 2008, pp. 336–338), and shelterwood cutting (Ellis 1998, p. 41–49). As a result, the combination of habitat loss and fragmentation of remnant suitable habitat effectively

lowers the density of martens by reducing the number of home ranges that can be supported (Thompson 1994, p. 276).

Historical and Current Distribution of Coastal Martens and Suitable Habitat

At the time of European settlement, the coastal marten occurred in all coastal Oregon counties and the coastal northern counties of California within late-successional coniferous forests. The majority of historical (pre-1980) verifiable marten detections (i.e., occurrence records supported by direct physical evidence such as tracks, photographs, and carcasses) were within the fog-influenced coastal coniferous forest as opposed to interior forests (Grinnell and Dixon 1926, p. 413). Specifically, Slauson and Zielinski (2007, p. 241) reported 83 percent of the coastal northern California marten historical records occurring less than 25 km (15 mi) from the coast and no records occurring greater than 35 km (22 mi) from the coast, while our analysis (see Service 2015, pp. 6, 31) revealed greater than 90 percent of the coastal Oregon marten historical records occurring closer to the coast than to the interior portions of the coastal marten's range. Historical abundance of coastal martens is unknown. However, as is typical of mammalian carnivores, coastal martens likely never occurred in high densities.

Unregulated fur trapping occurred throughout the coastal marten's historical range, and by the late 1920s, few marten were captured where they were once considered relatively abundant (Zielinski and Golightly 1996, entire). A marked decline in the number of coastal marten harvested in coastal northern California led to the closure of

marten trapping in northwestern California in 1946. In Oregon, marten fur trapping remains legal Statewide. Historical fur trapping is thought to have resulted in a significant contraction of coastal marten distribution and the extirpation of coastal marten from large portions of its historical range. Although we can make conclusions about the general historical distribution of coastal martens, information on historical population size is not available, thus precluding an accurate assessment of the impact of unregulated trapping on coastal marten population abundance.

Due to the lack of surveys for coastal martens, little information is available regarding their current distribution; this is particularly true for coastal Oregon. We do know, however, that there are at least three extant populations of coastal martens, one in coastal northern California, one in coastal southern Oregon, and one in coastal central Oregon, as described in detail below, and we have information regarding the extent of suitable habitat that is currently available to coastal martens throughout their range. It is therefore possible that coastal martens may occur in any of these areas of suitable habitat that have not been surveyed, or have been surveyed only sporadically. Here we briefly describe the areas of suitable habitat available to coastal martens.

Slauson *et al.* (In prep.(b)) developed a landscape habitat suitability model that we used to assess how much suitable habitat is currently available to coastal martens. The model was developed by identifying the combination of environmental, topographic, disturbance history, and vegetation variables that best described the distribution of marten detection/non-detection survey data. Specifics regarding model development and

variables can be found in the "Current Landscape Habitat Suitability" section of the Species Report (Service 2015, pp. 26–27). The model categorizes the landscape into low, medium, and high suitability classes representing the relative probability of marten occupancy of habitat at the landscape scale.

Model results indicate that approximately 41 percent of the coastal marten's historical range contain suitable habitat (described as low, medium, and high suitability habitat) for coastal martens (see "Current Landscape Habitat Suitability" section of the Species Report). The model identified approximately 59 percent of the remaining lands within the historical range of the coastal marten to be unsuitable, which includes (but is not limited to) forested habitat that is not utilized by martens (e.g., heavily managed timber lands), urban and suburban developments, and agricultural lands. However, it is important to note that, for the purposes of this analysis, we considered "low suitability habitat" as defined in this model to be "unsuitable" when examining the current and long-term stressors to the coastal marten and its habitat into the future. In other words, in evaluating stressors to the coastal marten and its habitat, we considered only areas that provide moderate- to high-suitability habitat as identified by the model. We came to this conclusion based on feedback from the species experts (Slauson *et al.*, In prep.(a)) who indicate that these "low suitability habitat" areas currently have a low probability of coastal marten occurrence. Including these areas as suitable habitat for the purposes of this analysis would bias the amount of actual suitable habitat present both currently and in the future.

Much of the coastal marten's historical habitat has been lost. Extensive logging of old-growth redwood habitat in coastal northern California began in the late 1800s, and coincided with unregulated fur trapping. Late-successional coniferous forests in coastal Oregon were also extensively harvested in the early 1900s. Currently, less than 5 percent of the redwood forests existing at the time of European settlement remain within the historical range of the coastal marten in coastal northern California (Save the Redwoods League 2015, no page number). Based on the best available information, much of the coastal coniferous forest habitat in both States, especially within a few miles of the coast, appears to be currently owned (in general) by either private industrial timber companies or smaller land owners, and managed for timber production.

Within the coastal marten's historical range, the majority of remaining late-successional coniferous forests suitable for the coastal marten is within national forests, and national and State parks. Where martens are known to occur, relatively high amounts of moderate- to high-suitability habitat are still found, and much of this habitat occurs in areas that are managed for the maintenance or enhancement of late-successional forest conditions that are beneficial to coastal martens. For example, approximately 71, 79, and 90 percent of the total available suitable habitat on Federal lands in the coastal central Oregon, coastal southern Oregon, and coastal northern California population areas, respectively, occur within the Northwest Forest Plan (NWFP) Federal reserve lands, which are designed to retain and accelerate the development of late seral characteristics. Currently, the largest contiguous blocks of suitable coastal marten habitat occur within the Six Rivers National Forest in the extreme northern portion of the historical range in

California, and in the adjacent Siskiyou portion of the Rogue River-Siskiyou National Forest in the southern portion of the historical range in Oregon. Large blocks of suitable habitat also occur in coastal central Oregon on the Siuslaw National Forest. Little suitable habitat is currently found in the southern half of the historical range in California. In the coastal northern portion of the historical range in Oregon, suitable habitat is limited to a narrow band along the coast. Finally, in the area between the Siskiyou and Siuslaw National Forests in the historical range in Oregon, there is some limited amount of suitable habitat on BLM ownership. Habitat conditions specific to each of the known extant population areas of coastal martens are discussed below.

Distribution and Abundance of Current Known Extant Populations

There are three known extant populations of coastal martens in coastal central Oregon, coastal southern Oregon, and coastal northern California, according to the best available scientific and commercial data (Figure 1; see section 8.1.2 (Delineation of Extant Population Areas) of the Species Report (Service 2015, p. 32)). These populations have been described as disjunct (e.g., Slauson and Zielinski 2009, pp. 35–36). Survey effort has been limited in some portions of the coastal marten's range, however. Therefore, it is unknown whether additional coastal martens may be found in areas that have not yet been surveyed. In addition, a few coastal marten verifiable detections occur outside these three population areas, but these martens are currently not considered part of any known viable population (Slauson *et al.*, In prep.(a)). Surveys for martens have occurred in much of the California portion of the historical range and suitable interior

habitat in southwestern Oregon, although minimal survey effort has occurred in coastal central Oregon and no surveys have occurred in coastal northern Oregon (see Figure 8.2 in the Species Report).

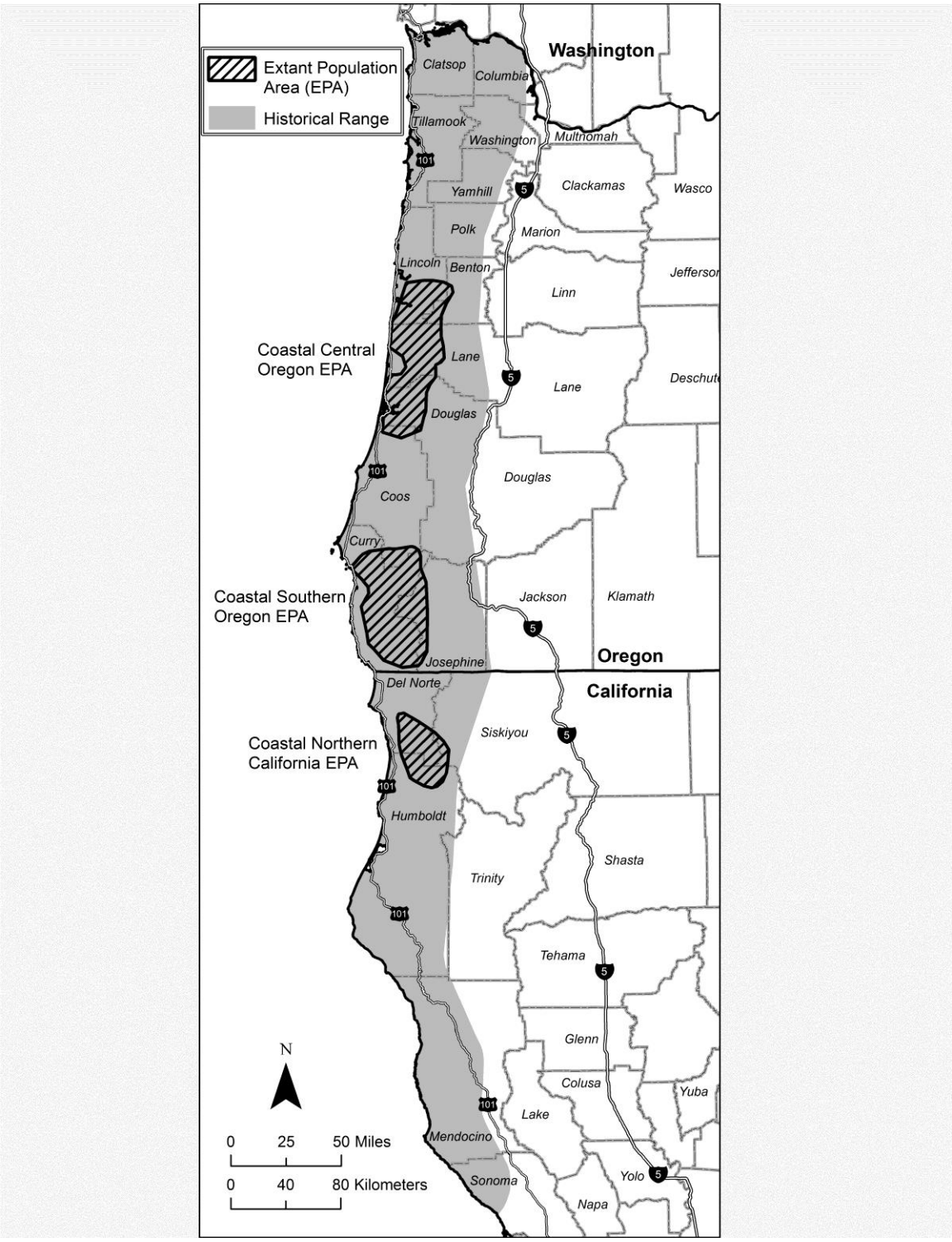

Figure 1— Analysis area showing historical range and extant population areas for coastal Oregon and northern coastal California populations of the Pacific marten (*Martes caurina*)

Coastal Central Oregon Extant Population Area

This 4,150-km^2 (1,602-mi^2) population area includes all coastal-draining watersheds from the Umpqua River north to the Yaquina River in Lincoln, Benton, western Lane, western Douglas, and northwestern Coos Counties. Lands within this extant population area are owned/managed by Siuslaw National Forest (41 percent), private landowners (40 percent), Bureau of Land Management (BLM; 10 percent), and Oregon Department of Forestry (ODF) and Oregon State Parks (9 percent). A total of approximately 2,348 km^2 (907 square miles (mi^2); 56 percent) of the extant population area contains moderate- and high-suitability habitat (Service 2015, p. 33) for coastal martens. Of the currently available moderate- and high-suitability habitat, 23 percent is in private ownership and 71 percent is in Federal ownership, and 71 percent of the Federal lands are in Reserves, which are managed for late-seral characteristics (Service 2015, p. 76). The best available information suggests that most of the private forest land is owned by private, industrial timber companies (Lettman 2011, p. 33).

This population area comprises approximately 20 percent coastal marten habitat of high suitability, 36 percent of moderate suitability, 22 percent of low suitability (which has low probability of coastal marten occurrence currently and into the future), and 21 percent unsuitable (Slauson *et al.*, In prep.(b)). In total, suitable marten habitat composes 78 percent of the population area. However, we note that the model (which used data from northwest California and southwest Oregon) generated suitable habitat values for

this population area that did not include coastal dune habitat, which is considered suitable for coastal martens based on visual observations and the presence of several verifiable marten detections (Slauson *et al.,* In prep.(a)). Thus the amount of potentially suitable habitat for coastal martens identified by the habitat model is an underestimate for this population area.

Population abundance information is not available for the coastal central Oregon population of coastal martens. Although only a single station had been surveyed in this population area since the late 1980s, presence/absence surveys began in this area in the summer of 2014. One marten was detected in 2014 (Slauson *et al.* 2014, unpubl. data), and six more were detected in January and February 2015; as of the time of this publication, surveys in this area are ongoing (Moriarty 2015, pers. comm.). The area surveyed represents only about 4 percent of the currently delineated coastal central Oregon population area described herein, and 2014 was the first year of survey effort in this area. Based on the results to date and the availability of suitable habitat in this area, it is likely that more martens will be detected in this area as surveys continue.

Abundance or trend information is not available for any populations of coastal martens in Oregon. Although researchers note that martens in this area have likely declined relative to their historical condition, they cite to insufficient historical or contemporary data to allow evaluation of the status of martens in the coastal mountain ranges of central and northern Oregon (Zielinski *et al*. 2001, p. 486). There are no data available for estimating current population abundance or trend for the coastal central

Oregon population, and although survey efforts recently began in this area, data from these surveys will only be informative in terms of establishing presence or absence of coastal martens. Zielinski *et al.* (2001, pp. 486–487) could only suggest that marten numbers may be relatively low on the northern Oregon coast, based on the absence of reported road kills along coastal Highway 101 in this area, in contrast to several road-killed martens reported from the same highway in central Oregon. In sum, although coastal martens have likely declined relative to their historical abundance due to the past effects of overtrapping and timber harvest (Zielinski *et al.* 2001, p. 487), there are no empirical data on which to base an estimate of either current population abundance or trend of martens on the central Oregon coast.

Coastal Southern Oregon Extant Population Area

This 4,696-km^2 (1,813-mi^2) population area includes Chetco River, Pistol River, south Fork Rough and Ready Creek, and the North Fork Smith River watersheds in Curry, western Josephine, and southern Coos Counties. Lands within this population area are owned/managed by Rogue River-Siskiyou National Forest (78 percent), private landowners (13 percent), BLM (8 percent), and ODF (less than 1 percent). A total of approximately 3,641 km^2 (1,406 mi^2; 78 percent) of the extant population area contains moderate- and high-suitability habitat (Service 2015, p. 35). As stated above for the coastal central Oregon population area, present moderate- and high-suitability habitat on private lands is expected to be harvested or not likely to retain late-seral characteristics into the future. Of the currently available moderate- and high-suitability habitat in the

coastal southern Oregon population area, 10 percent is private ownership and 90 percent is Federal ownership, and 79 percent of the federally managed lands are Federal Reserves, which are managed for late-seral characteristics (Service 2015, p. 76). The best available information suggests that most of the private forest land is owned by private, industrial timber companies (Lettman *et al.* 2011, p. 33).

This population area comprises approximately 52 percent coastal marten habitat of high suitability, 26 percent of moderate suitability, 17 percent of low suitability, and 5 percent unsuitable (Slauson *et al.*, In prep.(b)). In total, suitable marten habitat composes 95 percent of the population area.

Similar to the situation for the coastal central Oregon population, described above, population abundance information is not available for the coastal southern Oregon population of coastal martens. Although extensive grid-based surveys (which are used to estimate marten abundance or presence/absence) have not been conducted for this population, grid-based surveys began in this area in the summer of 2014. No coastal martens were detected in 2014 (Slauson *et al.* 2015, unpubl. data), but surveys just beginning at the time of this publication have yielded a single marten detection (Moriarty 2015, pers. comm.). The area surveyed represents only a small portion of the currently delineated coastal southern Oregon population area described herein, and 2014 represented the first year of survey effort in this area. At this time, similar to the coastal central Oregon population area, there are no empirical data on which to base an estimate of either current population abundance or trend of martens on the southern Oregon coast.

Coastal Northern California Extant Population Area

This 812-km^2 (313-mi^2) population area includes the south Fork of the Smith River, Blue Creek, Bluff Creek, Camp Creek, Cappell Creek, Pecwan Creek, Slate Creek, and Rock Creek (Siskiyou County, north of Orleans, California) watersheds in Del Norte, northern Humboldt, and western Siskiyou Counties. Lands within this population area are owned/managed by the U.S. Forest Service (Forest Service) (Klamath National Forest and Six Rivers National Forest; 65 percent); the Yurok Tribe of the Yurok Reservation, California (Yurok Tribe; 23 percent); private landowners, primarily Green Diamond Resource Company (11 percent); and Redwood National and State Parks (1 percent). A total of approximately 656 km^2 (253 mi^2; 81 percent) of the extant population area contains moderate- and high-suitability habitat (Service 2015, p. 75). Currently present moderate- and high-suitability habitat on private lands is expected to be harvested or not likely to retain late-seral characteristics into the future. Of the currently available moderate- and high-suitability habitat in the coastal northern California population area, 11 percent is private ownership and 77 percent is Federal ownership, and 90 percent of the federally managed lands are Federal Reserves, which are managed for late-seral characteristics (Service 2015, p. 75). The best available information suggests that most of the private land is owned by private, industrial timber companies (Service 2014, unpubl. data).

This population area comprises approximately 67 percent coastal marten habitat

of high suitability, 14 percent of moderate suitability, 7 percent of low suitability, and 12 percent unsuitable (Slauson *et al.,* In prep.(b)). In total, suitable marten habitat composes 88 percent of the population area.

As reported in 1996 by Zielinski and Golightly (1996, entire), this coastal northern California population has apparently recovered from numbers that were once so low (in the 50 years prior to 1995) that it was considered to be extremely rare or extinct. Martens in coastal northern California were first surveyed to estimate abundance in 2000–2001, and again in 2008 (Slauson *et al.* 2009b, p.11) and 2012 (Slauson *et al.* 2014, unpubl. data). A total of 31.5 martens (95 percent confidence interval = 24–40) were estimated for 2000–2001, and 20.2 martens (95 percent confidence interval = 11–30) were estimated for 2008, which represents a 42 percent decline in occupancy between those two time periods (Slauson *et al.* 2009b, pp. 10, 11). In 2012, all locations sampled in 2008 were resampled (Slauson *et al*., In prep.(a)). Preliminary occupancy estimates for the 2012 sampling were similar to results from 2008 (Slauson *et al*., In prep.(a)), suggesting no further changes in marten population abundance in northern coastal California between 2008 and 2012. Slauson *et al.* (2009b, p. 13) advised that these population estimates should be considered minimum estimates because the sampling area did not fully cover all potentially occupied habitats; therefore, they suggested more realistic population estimates should be doubled (i.e., 60 coastal martens in 2000–2001, and 40 in 2008). Based on these samples, Slauson *et al.* (2009b, p. 13) concluded that as of 2008, it was likely that the entire coastal northern California population of martens contained fewer than 100 individuals. As noted above, subsequent survey efforts in 2012

indicated no further changes in estimated population size since that time; therefore, the best available data (preliminary estimates from surveys in 2012) suggest that the current population estimate for the coastal northern California population is similar to the estimate for 2008 (i.e., fewer than 100 individuals).

Summary of Information Pertaining to the Five Factors

Section 4 of the Act (16 U.S.C. 1533) and implementing regulations (50 CFR 424) set forth procedures for adding species to, removing species from, or reclassifying species on the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, a species may be determined to be an endangered or threatened species based on any of the following five factors:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

In making this finding, information pertaining to the coastal DPS of the Pacific marten in relation to the five factors provided in section 4(a)(1) of the Act is discussed below. In considering what factors might constitute threats to a species, we must look beyond the mere exposure of the species to a particular factor to evaluate whether the

species may respond to that factor in a way that causes actual impacts to the species. If there is exposure to a factor but no response, or only a positive response, that factor is not a threat. If there is exposure and the species responds negatively, the factor may be a threat and we then attempt to determine if that factor rises to the level of a threat, meaning that it may drive or contribute to the risk of extinction of the species such that the species warrants listing as an endangered or threatened species as those terms are defined in the Act. However, the identification of factors that could impact a species negatively is not sufficient to compel a finding that the species warrants listing. The information must include evidence sufficient to suggest that these factors are operative threats that act on the species to the point that the species meets the definition of an endangered or threatened species under the Act.

Potential stressors that may impact coastal martens in coastal Oregon and coastal northern California include actions that may affect marten individuals or populations (i.e., trapping (for fur and research purposes), predation, disease, collision with vehicles, and exposure to toxicants) and actions that may lead to the loss, degradation, or fragmentation of suitable marten habitat (i.e., wildfire, climate change, vegetation management, and development). To provide a temporal component to our evaluation of potential stressors (i.e., impacts into the future), we first determined whether we had data available that would allow us to reasonably predict the likely future impact of each specific stressor over time. Where such data were available, we made predictions of future conditions over a period of time specific to that stressor (i.e., wildfire, climate change, as described below). If we did not have such stressor-specific data available, we used IUCN's standard 3-generation timeframe to assess risk (International Union for Conservation of

Nature (IUCN) 2014, pp. 14–21). Using a calculated marten generation time of 5 years (see the Species Report for more information on calculating marten generation time), this translated to a timeframe of 15 years, which we used in analyzing the foreseeable future for the majority of the stressors discussed below. This time period allows for analysis of multiple generations of coastal martens over a reasonable time period, as opposed to examining further into the future where assumptions or extensive uncertainty would not allow meaningful projections of potential future impacts.

To assess the stressor of wildfire, we used a longer future period consisting of 30 years based on more extensive data available regarding wildfires from the past approximate 30 years. This information was used to predict the future equivalent level of expected fire frequency, size, and severity. Using a longer foreseeable future timeframe for wildfire better incorporates the range of fire-related activity that may occur within the coastal Oregon and coastal northern California population areas. To assess the stressor of climate change, we used a longer foreseeable future period of 40–50 years, which coincides with the model projection timeframes available for climate change (e.g., changes in temperature and precipitation) in coastal Oregon and coastal northern California. Climate projections beyond this approximate time period diverge with increasing uncertainty (see, e.g., Lenihan *et al*. 2008, pp. 16–17), including uncertainties in the magnitude and timing, as well as regional details, of predicted climate change, especially at smaller scales (IPCC 2015, no page number), which is why we cannot reliably project future climate change effects beyond this timeframe.

A thorough review of each of the potential stressors is presented in the Species

Report (Service 2015, pp. 41–78), which is available on the Internet at *http://www.regulations.gov*, Docket No. FWS–R8–ES–2011–0105. A summary of this information is presented below.

Each potential stressor was evaluated to determine the likely impact to coastal martens or their habitat.

- A low-level impact indicates: (1) Individual martens in one or more populations may be impacted, but not at the population level; or (2) minimal loss, degradation, or fragmentation of suitable habitat.
- A medium-level impact indicates: (1) Individual martens in one or more populations are being impacted, likely resulting in a population-level impact; or (2) moderate loss, degradation, or fragmentation of suitable habitat.
- A high-level impact indicates: (1) Individual martens in one or more populations are being impacted, likely resulting in a significant population-level impact; or (2) significant loss, degradation, or fragmentation of suitable habitat.

Factor A—The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range.

Wildfire

Wildfire can impact individual coastal martens directly through mortality (Factor E); however, fires generally kill or injure a relatively small proportion of animal

populations, particularly if they are mobile (Lyon *et al*. 2000, pp. 17–20), and the best available data do not indicate that wildfire is causing loss of individual martens. If direct mortality of individual martens occurs, we expect the impact to be discountable because martens are capable of rapid evacuation from an approaching fire, and adequate suitable habitat likely exists within their extant population areas to establish a new home range (provided the majority of the suitable habitat within the extant population area is not subjected to an overly large, high-severity wildfire).

Wildfire is a major disturbance force of habitat within the range of the coastal marten in all but the wettest coastal forests and thus has been analyzed in terms of its effect on coastal marten habitat. Wildfire can affect the composition and structural characteristics of the forest communities at multiple spatial and temporal scales. Fire severity is often expressed in categories of high, medium, or low severity, as well as mixed severity. High-severity fire, also called stand-replacing fire, kills all or nearly all vegetation within a stand and may extend across a landscape (Jain *et al.* 2012, p. 47). Medium-severity fire refers to fire that is intermediate in its effects between high-severity and low-severity fire; for example, a fire may kill scattered clumps of overstory trees within a stand. Low-severity fire burns at ground-level and does not kill most overstory trees, although it may consume understory vegetation and downed woody debris (Jain *et al.* 2012, p. 47). Finally, mixed-severity fire includes patches of low-severity fire and patches of high-severity fire (Jain *et al.* 2012, p. 47).

Regional moisture gradients result in wildfires occurring more frequently with

increasing distance from the coast and farther south in the coastal marten's range. The effect of fire on coastal marten habitat varies from high-severity fires that consume much or all of the structural features (e.g., large trees, snags, logs) that are important elements of suitable coastal marten habitat, requiring centuries to regrow, to low-severity fires that burn only the dense, shade-tolerant shrub layer preferred by the coastal marten (Slauson *et al.* 2009b, p. 11). The shrub layer likely takes 1 to 2 decades to regrow to suitable size and density, depending on its fire resistance and adaptive response to disturbances (Slauson 2014, pers. comm.). However, some low-severity fires may burn ground cover without burning the dense, shade-tolerant shrub layer preferred by the coastal marten. Wildfires within the range of the coastal marten often burn at mixed severities (Landscape Fire and Resource Management Planning Tools Project (LANDFIRE) 2008a; LANDFIRE 2008b; LANDFIRE undated(a)), with some areas within the fire perimeter burning at a high severity, resulting in stand replacement, and other portions burning at low severity, resulting in the loss of only ground vegetation. Fire effects are complex; therefore, potential impacts of future wildfires on coastal marten suitable habitat are difficult to predict.

Historical fire records indicate that, compared to the coastal central Oregon population area, the coastal northern California and coastal southern Oregon population areas (including adjacent or intervening areas) have experienced larger and more severe wildfires (Monitoring Trends in Burn Severity (MTBS; 2013, entire), both also experiencing many small (less than 0.4 hectares (ha) (1 acre (ac)) fires. The potential for severe, stand-replacing wildfire has increased in some areas where fire suppression and

regeneration timber harvest (i.e., the intent to develop a new stand/forest) have played a role in raising fuel load to levels that place late-successional forest at increased risk (Forest Service and BLM 1994b, pp. 3, 4–49). Although fire suppression is known to contribute to the severity of wildfire in some areas, within at least parts of coastal northern California and coastal southern Oregon, fire suppression has had little effect on altering the structure and composition of the dominant forest types and has not caused an increase in high-severity fire compared to the historical patterns (Odion *et al.* 2004, pp. 933–935; Miller *et al.* 2012, p. 200). In other words, the period of fire suppression may not be long enough to manifest such effects in coastal forest types where the return intervals for high-severity, stand-replacing fires are on the order of centuries (e.g., Veirs 1982, pp. 132–133; Oneal *et al.* 2006, pp. 82–87).

The best available historical fire information and the more xeric nature (i.e., environment containing little moisture) of the interior within the Klamath Ecoregion indicate that future loss, degradation, or fragmentation of moderate- and high-suitability coastal marten habitat from wildfires will likely result in a greater impact in the coastal southern Oregon and coastal northern California populations as compared to the coastal central Oregon population. However, the more coastal climate where most martens occur may have an ameliorating effect (e.g., increased humidity, reduced temperatures) on fires, reducing the size of fires in the coastal area compared to those more characteristic of the rest of the Klamath Ecoregion. Historical data between 1984 and 2012 indicate that wildfires burned approximately 17 percent and 42 percent of the combined moderate- and high-suitability coastal marten habitat within the coastal northern California and coastal

southern Oregon population areas, respectively, with a few large fires responsible for the majority of burned suitable habitat (MTBS 2013, entire). We note that these wildfires burned at varying levels of severity; in other words, although some suitable habitat was lost as a result of the wildfires, varying levels of suitable habitat remain throughout the population areas, with moderate- and high-suitability habitat remaining within the wildfire perimeters after the fires were extinguished (Service 2014, unpubl. Geographic Information System (GIS) analysis).

It is possible that fire frequency, size, and severity may increase in the future within coastal Oregon (both central and southern) and coastal northern California, based on projected increases in temperature and decreased precipitation (see "Climate Change," below), with potentially greater increases within coastal southern Oregon and coastal northern California based on the history of wildfire within these portions of the coastal marten's range. In contrast, little moderate- and high-suitability coastal marten habitat has burned (historically, between 1984 and 2012) within and adjacent to the coastal central Oregon population area (MTBS 2013, entire). Large, stand-replacing fires occur infrequently (at intervals greater than 200 to 250 years) within coastal central Oregon (Impara 1997, p. 92; Long *et al.* 1998, p. 786; Long and Whitlock 2002, p. 223l; LANDFIRE 2008a). In general, most fires that have recently occurred within the range of coastal marten have burned at mixed severity (e.g., LANDFIRE 2008a; LANDFIRE 2008b; LANDFIRE undated(a)), resulting in some areas burning at a lower intensity with loss of only ground or shrub understory vegetation, and retaining of a portion of the moderate- and high-quality habitat within the fire perimeters.

In our initial development of the Species Report, we identified an overall low-level impact across the northern portion of the coastal marten's range, and a medium-level impact across the southern portion of the coastal marten's range (see section 9.2.3.1 in the Species Report). These overall impact levels were based on the probability of occurrence of a wildfire over a 15-year time period. When considering historical fire data over a 30-year time period to predict the future equivalent level of expected fire frequency, size, and severity (see Appendix A in the Species Report), the overall level of impact (i.e., probability of occurrence of a wildfire) is potentially the same. However, this impact level estimate does not take into account the historical fire data (e.g., LANDFIRE 2008a; LANDFIRE 2008b; LANDFIRE undated(a)) that show most wildfires burned at low severity and retained moderate- and high-quality habitat post-fire.

Based on the analysis contained within the Species Report and summarized above, we expect that within the range of the coastal marten, the incidence of wildfire in the future will be similar to that recorded for 1984 to 2012. We note, however, that high-severity fires have been infrequent in the past and are considered to remain infrequent, overall, into the future. Our expectation is that fire frequency, size, and severity in the future will be fairly similar (or slightly higher in some areas based on climate change predictions). Based on these 30 years (i.e., 1984–2012) of data, we can reasonably estimate these effects will continue with the same approximate level of impact into the next 30 years as has occurred over the previous 30 years (i.e., mixed severity wildfires will likely occur although most will be low severity and retain some moderate- and high-

quality habitat post-fire); thus, we predict that, overall, these impacts do not rise to the level of a threat. We base this conclusion on:

(1) The persistence of moderate- and high-quality habitat that has remained following recent large wildfires (i.e., wildfires that have burned at mixed severities (LANDFIRE 2008a; LANDFIRE 2008b; LANDFIRE undated(a)), which have not resulted in extensive stand-replacement within the coastal marten's range.

(2) The overall continued presence of relatively moist habitat conditions for coastal marten habitat, primarily along the western coast, including overall cooler, moist summer conditions that moderate the dry conditions that promote fire ignition and spread.

(3) Information indicating that parts of coastal northern California and coastal southern Oregon have experienced fire suppression with little effect on altering the structure and composition of the dominant forest types, and no increase in high-severity fire compared to the historical patterns (Odion *et al.* 2004, pp. 933–935; Miller *et al.* 2012, p. 200).

Climate Change

"Climate" refers to the mean and variability of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (Intergovernmental Panel on Climate Change [IPCC] 2013, p. 1,450). The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability,

human activity, or both (IPCC 2013, p. 1,450). A recent synthesis report of climate change and its effects is available from the IPCC (IPCC 2014, entire).

Changes in climate may have direct or indirect effects on species. These effects may be positive, neutral, or negative, and they may change over time, depending on the species and other relevant considerations, such as interactions of climate with other variables (e.g., habitat fragmentation, fire frequency) (IPCC 2007, pp. 8–14, 18–19). Typically, expert judgment and appropriate analytical approaches are used to weigh relevant information, including uncertainty, in various aspects of climate change.

Global climate projections are informative, and in some cases, the only scientific information available. However, projected changes in climate and related impacts can vary substantially across and within different regions of the world (e.g., IPCC 2007, pp. 8–12). Therefore, we use "downscaled" projections (see Glick *et al.* 2011, pp. 58–61, for a discussion of downscaling) when they are available and have been developed through appropriate scientific procedures, because such projections provide higher resolution information that is more relevant to spatial scales used for analyses of a given taxon. For this analysis across the range of the coastal marten, downscaled projections are used in addition to some regional climate models that provide higher resolution projections using a modeling approach that differs from downscaling. The geographic region of the projections is the southern terminus of temperate rainforests of the North American continent, which encompasses the range of the coastal marten.

Climate throughout the range of the coastal marten is projected over the next approximately 40 to 50 years to become warmer, and in particular summers will be hotter and drier, with more frequent heat waves (Pierce *et al.* 2013, p. 848; Cayan *et al.* 2012, p. 10; Salathé *et al.* 2010, p. 69; Tebaldi *et al.* 2006, pp. 191–200; Hayhoe *et al.* 2004, p. 12423). However, the northern portion of the coastal marten's range will likely experience winters that may become wetter, although warmer temperatures may result in an overall water deficit (Pierce *et al.* 2013, p. 848; Cayan *et al.* 2012, p. 10; Salathé *et al.* 2010, p. 69; Tebaldi *et al.* 2006, pp. 191–200; Hayhoe *et al.* 2004, p. 12423). The coastal marten's currently suitable habitat may be affected by climate change to some extent. At this time, nearly all models for the coastal northern California and coastal southern Oregon population areas predict shifts in vegetation type over time from conifer forest to mixed-conifer hardwood forest, as well as shifts toward woodland and chaparral, with some shifts predicted to be observable by 2030, but most by the end of the century (roughly 2070 through 2099) (Whitlock *et al.* 2003, p. 16; Rehfeldt *et al.* 2006, p. 1143; Lenihan *et al.* 2008, p. 20; Doppelt *et al.* 2009, p. 7; Littell *et al.* 2011, pp. 11–12; Shafer *et al.* 2010, pp. 180–181; Littell *et al.* 2013, pp. 113–115). The predicted extent and nature of these shifts and the potential rate of change vary greatly, depending on potential emissions scenarios, assumptions (for example, in how various plant species are likely to respond to changes in temperature, precipitation, and carbon dioxide concentration), and variables incorporated into the models. Despite these differences, most models produce qualitatively similar forecasts of the impacts of potential future climates on ecosystem distribution, function, and disturbances (Shafer *et al*. 2010, p. 179). Although climate models have become increasingly sophisticated, the simulated future response of

ecosystems remains subject to great uncertainty due to a number of factors, especially over longer timeframes (see, e.g., Lenihan *et al*. 2008, pp. 16-17). In sum, although there is general agreement in the direction and nature of changes anticipated, models continue to have limitations which lead to uncertainties in the magnitude and timing, as well as regional details, of predicted climate change, especially at smaller scales (IPCC 2015, no page number) Thus, although we anticipate the coastal marten's currently suitable habitat may be affected by climate change to some extent, there is a high level of uncertainty regarding the nature of any such effects and the likelihood and timing of their occurrence.

In coastal central and northern Oregon, models also project shifts by the end of this century in vegetation type from maritime conifer forest toward mixed conifer-hardwood and deciduous forests, although models differ in the extent of this change (Whitlock *et al.* 2003, p. 16; Rehfeldt *et al.* 2006, p. 1143; Lenihan *et al.* 2008, p. 20; Doppelt *et al.* 2009, p. 7; Littell *et al.* 2011, pp. 11–12; Shafer *et al.* 2010, pp. 180–181; Littell *et al.* 2013, pp. 113–115). These shifts in future vegetation type may lead to range shifts for the coastal marten, although information is not available to indicate how rapidly this may occur. It is important to note that studies of climate change present a range of effects including some that indicate conditions could remain suitable for coastal martens. For example, in areas with stable or increasing total precipitation, overall warmer temperatures are expected to result in a decreased snowpack ((Cayan *et al.* 2012, pp. 20–21; Littell *et al.* 2011, p. 60; Salathé *et al.* 2010, pp. 66–68; Hayhoe *et al.* 2004, p. 12423), which would result in increased availability of habitat for coastal martens at higher elevations, as well as increased availability of prey during the winter months

(Service 2015, p. 7). Overall, it is not clear how finer-scale abiotic factors may shape local climates and influence local vegetation trends either to the benefit or detriment of coastal martens, nor is the timeframe clear over which these influences may be realized.

We note that redwood forest habitat within coastal national and State parks to the west of the coastal northern California population area may remain suitable for coastal martens even with projected changes in climate (based on a moderate emissions scenario within 50 years; DellaSala 2013, entire). However, to reach this coastal redwood habitat, martens would need to traverse many kilometers of unsuitable habitat (i.e., industrial timberlands). Martens actively select against these areas that do not have protective overstory cover; however, limited movement across unsuitable habitat areas may occur. In contrast, coastal martens currently occurring within the drier, interior portions of the coastal southern Oregon population area could migrate into other suitable habitat to the west as climate change alters the more interior habitat; a natural, westward migration is possible due to a lack of significant physical barriers to east-west movements within that region.

Overall, studies of climate change present a range of effects on vegetation, including some that indicate conditions could remain suitable for coastal martens in portions of the coastal range; furthermore, the severity of potential impacts to coastal marten habitat will likely vary across the range, with effects to coastal martens potentially ranging from negative, neutral, or beneficial. Thus, the Species Report described an estimated range of low- to medium-impact for this stressor for coastal southern Oregon

and coastal northern California (Service 205, pp.67–72). Modeling projections are done at a large scale, and effects to species' habitat can be complex, unpredictable, and highly influenced by local-level biotic and abiotic factors. Although many climate models generally agree about the changes in temperature and precipitation, the consequent effects on vegetation are more uncertain, as is the rate at which any such changes might be realized. Therefore, it is not clear how or when changes in forest type and plant species composition will affect the distribution of coastal marten habitat. How any such changes may in turn affect coastal marten populations is even more uncertain. Thus, uncertainty exists when determining the level of impact climate change may have on coastal marten habitat. Consequently, at this time and based on the analysis contained within the Species Report and summarized above, we have determined that we do not have reliable information to indicate that climate change is a threat to coastal marten habitat now or in the future, although we will continue to seek additional information concerning how climate change may affect coastal marten habitat.

Vegetation Management

Vegetation management includes activities such as timber harvest, thinning, fuels reduction, and habitat restoration, which can result in the temporary or permanent loss, degradation, or fragmentation of suitable coastal marten habitat. Once lost, structural elements found in suitable coastal marten habitat that are required for denning and resting (such as large diameter live trees, snags, and logs) require more than a century to develop (Slauson and Zielinski 2009, p. 43). Slauson (2014, pers. comm.) anticipates that loss of

the dense, shade-tolerant shrub layer required by the coastal marten would take 1 to 2 decades to regrow.

Historically, vegetation management activities (particularly large-scale harvest of late-successional coniferous forest habitat) reduced the amount and distribution of suitable coastal marten habitat. At the present time, although the reduction and fragmentation of some suitable coastal marten habitat is expected to continue, the majority of suitable habitat for coastal martens is currently secure and expected to increase in the future. Habitat loss and degradation is expected to be realized primarily on private lands, which constitute a relatively small proportion of the suitable habitat available to martens in the three extant population areas (23 percent in coastal central Oregon, 10 percent in coastal southern Oregon, and 11 percent in coastal northern California). In contrast, most suitable marten habitat is in Federal ownership (71 percent in the coastal central Oregon population area, 90 percent in the coastal southern Oregon population area, and 77 percent in the coastal northern California population area), and the majority of those lands are in reserve allocations under the NWFP, which are managed for the maintenance or development of late-successional forest characteristics (71 percent of Federal lands in reserves in coastal central Oregon, 79 percent of Federal lands in reserves in coastal southern Oregon, and 90 percent of Federal lands in reserves in coastal northern California). We therefore expect not only the maintenance but further recruitment of suitable coastal marten habitat on Federal reserve lands over time.

Some vegetation management activities (such as thinning, fuels reduction

projects, and habitat restoration) have the potential to improve habitat suitability for the coastal marten in the long term by minimizing loss of late-successional stands due to wildfires and accelerating the development of late-seral characteristics (Zielinski 2013, pp. 419–422). This has been suggested for a similar mustelid, the fisher, where such activities may be consistent with maintaining landscapes that support fishers in the long term and sometimes even the short term, providing treatments retain appropriate habitat structures, composition, and configuration (Spencer *et al.* 2008, entire; Scheller *et al.* 2011, entire; Thompson *et al.* 2011, entire; Truex and Zielinski 2013, entire; Zielinski 2013, pp. 17–20). Thus, it is reasonable to assume that these types of projects could increase the long-term, overall amount, distribution, and patch size of suitable coastal marten habitat, although some short-term degradation, loss, or fragmentation of suitable coastal marten habitat may occur in the interim.

On lands managed for industrial timber harvest, the past and current practice of managing coastal coniferous forests on a short-rotation system (40–60 years) to maximize wood production has reduced the complexity of the shrub and herb layers, which are important components of suitable marten habitat. These management practices have also precluded development of late-successional forest characteristics that are important to the coastal marten (such as large diameter logs, snags, and trees). Short-rotation forestry is prevalent on private lands, whereas only a small fraction of forested Federal lands (i.e., “matrix” lands as defined under the NWFP) may be used for timber harvest.

Due to current and expected future intensive timber-harvesting activities, we do not anticipate that private lands would support viable marten populations or maintain important habitat elements in the future. Instead, the coastal marten relies on (and our analysis considers) the maintenance of suitable coastal marten habitat on Federal and State lands as the key element to support the long-term viability of coastal marten populations. Of the coastal marten suitable habitat within the three extant population areas, from 71 to 90 percent is on Federal lands and in reserve status under the NWFP, much of which is managed specifically for the development of late-successional characteristics that will be beneficial for coastal martens. Specifically, and at present:

(1) In the coastal central Oregon extant population area, 79 percent of the habitat is considered suitable for coastal martens (56 percent moderate to high suitability). Approximately 71 percent of the moderate- to high-suitability habitat occurs within Federal ownership, and 71 percent of that is Federal Reserve land.

(2) In the coastal southern Oregon extant population area, 95 percent of the habitat is considered suitable for coastal martens (78 percent moderate to high suitability). Approximately 90 percent of the moderate- to high-suitability habitat is in Federal ownership, and 79 percent of that is Federal Reserve land.

(3) In the coastal northern California extant population area, 87 percent of the habitat is considered suitable habitat for coastal martens (81 percent moderate to high suitability). Approximately 77 percent of that is in Federal ownership, and 90 percent of that is Federal Reserve land.

A small proportion of the moderate- and high-suitability habitat occurs on Federal

matrix lands (i.e., lands as defined under the NWFP that are used for timber harvest). The rate of loss of late-successional and old-growth forest on Federal lands due to timber harvest has declined substantially since the implementation of the NWFP (Mouer *et al.* 2011, entire). Although the NWFP does not recognize marten habitat as a forest class or condition, late-successional old growth forest likely includes a subset of coastal marten habitat (if the necessary dense shrub layer is present).

Based on the analysis contained within the Species Report and summarized above, including the proportion of moderate- and high-suitability coastal marten habitat available and the favorably managed forested lands (primarily Federal Reserves) within each extant population area, we consider ongoing vegetation management to have a low impact on the loss, degradation, or fragmentation of suitable coastal marten habitat across the range of the DPS both currently and into the future. We note that loss of suitable habitat (primarily low-quality suitable habitat) is expected to continue to occur into the future on private lands within all three population areas, potentially to a greater extent in the coastal central Oregon population area due to a larger percentage of privately-owned timber lands within that population area. For the entire range, we considered vegetation management as a low-level impact on moderate and high suitability marten habitat for Federal lands, which constitute a majority of the extant population areas, have longer harvest rotations, and retain more structural features on the subset of that area in matrix, or where habitat will be retained on lands in Federal Reserves. In addition, because of the extent of Federal reserve land allocations that are designed to maintain and develop late-successional conditions, an unquantifiable amount of suitable habitat for coastal

martens is expected to develop in the future. Overall, potential impacts from vegetation management do not rise to the level of a threat given the extensive beneficial land management practices expected to continue into the future (15 years) on public lands.

Development

Some impacts to suitable habitat are expected to occur within the range of the coastal marten as a result of development activities such as road building, dam construction and creation of new reservoirs, conversion of forest habitat for agricultural use, development and expansion of recreational areas (e.g., golf courses, campgrounds, and trails), urban expansion, and rural development. Should these types of disturbances occur, they would likely result in the further loss, degradation, or fragmentation of suitable habitat. However, if these activities occur into the future, only a small amount of habitat may be impacted rangewide based on our evaluation of the best available data at this time because most of the potential development is expected on private lands that afford the coastal marten little suitable habitat to begin with. In addition, many of the areas that provide suitable habitat for coastal martens are areas of challenging topography that are not conducive to intensive or large-scale development.

In Oregon, the greatest rates of change from resource land use to more developed use occurred prior to 1984, before implementation of county land-use plans and land-use planning laws (Oregon Administrative Rule 660–015–00) that limit the conversion of designated resource lands, including forest lands, to other uses (Lettman *et al.* 2011, p.

16). These laws encourage intensified development in areas already urbanizing, while limiting development in more rural areas (Lettman *et al.* 2009, p. 4; Lettman *et al.* 2011, p. 9). Consequently, conversion of non-Federal forest land has been limited in Oregon, with 98 percent of all non-Federal forest, agricultural, and range lands in the State in 1974 remaining in those uses in 2009 (Lettman *et al.* 2011, p. 11). Virtually all land-use change during this time occurred on private land (Lettman *et al.* 2011, p. 11). However, development of private land within 1.6 km (1 mi) of Federal forest land is increasing, which can affect management along the periphery of adjacent Federal lands, such as increasing the need for fuel treatments on public lands to protect structures on adjacent private lands (Lettman *et al.* 2009, pp. 33–34; Azuma *et al.* 2013, pp. 1–2). Development of Federal forest lands in California and Oregon, however, is expected to be limited given past history (e.g. Lettman *et al.* 2011, p. 11 for Oregon) and the management mandates of the land management agencies.

Based on the analysis contained within the Species Report and summarized above, and similar to the vegetation management discussion above, we estimate that development has a low impact on the loss, degradation, or fragmentation of suitable coastal marten habitat across the range of the DPS both currently and into the future, and thus does not rise to the level of a threat. If development occurs, the frequency and amount of habitat impacted may be greater in the coastal central Oregon population area as opposed to the other two population areas due to a larger percentage of privately-owned timber lands within the coastal central Oregon population area. However, as exhibited over the past 30 years, any loss is expected to be small.

Factor B—Overutilization for Commercial, Recreational, Scientific, or Educational Purposes.

Trapping

Trapping for Fur

Historical unregulated fur trapping (prior to the 1930s) of coastal martens is considered by researchers as the likely cause of the marked contraction in coastal marten distribution. Legal marten fur trapping in coastal northern California ended in 1946. However, fur trapping remains legal and has continued in Oregon, and the number of martens harvested in coastal Oregon counties has declined since the 1940s (Zielinski *et al.* 2001, p. 482), although it is not known whether trapping effort remained unchanged over this time period. By the 1970s, martens were considered rare along the Oregon coast (Zielinski *et al.* 2001, p. 483; Mace 1970, pp. 13–14; Maser *et al.* 1981, pp. 293–294). A total of 36 martens were harvested within coastal Oregon counties between 1969 and 1995 (Verts and Carraway 1998, p. 409). This harvest level excludes Lane and Douglas Counties because a substantial area of these counties is outside the DPS and fur trapping is only reported at the county level. The most recent data indicate that three coastal martens were trapped within coastal Oregon during the 2013 fur trapping season (Oregon Department of Fish and Wildlife, unpublished data). Overall, based on these data, the number of martens trapped in coastal Oregon has averaged fewer than two

animals a year in recent decades. The fur trapping effort for martens in Oregon is relatively minimal; the Oregon Department of Fish and Wildlife reports that few trappers, generally from 4 to 8, trap for marten anywhere in the State in any given year. Most recent harvests of martens are from the Cascades and Blue Mountain Ranges; harvest of martens in the Coast Range is extremely rare (Hiller 2011, p. 17). Any potential population impacts of removing individual coastal martens as a result of fur trapping are difficult to estimate due to a lack of population size estimates in both Oregon population areas. The best available data indicate, however, that relatively few martens are removed from coastal populations as a result of fur trapping in Oregon, and we have no evidence to suggest that these populations may be in decline as a consequence of fur trapping.

Based on the analysis contained within the Species Report and summarized above, we consider the legal fur trapping of coastal martens as having no overall impact to the population in coastal northern California, as there is no legal fur trapping for martens in that State. Fur trapping effort for martens in Oregon is relatively minimal, and most martens harvested are not trapped in the coast ranges. We estimate a low- to medium-level of impact to the two extant populations in coastal Oregon, reflecting the uncertainty regarding the size of those populations. We estimate that the impacts of fur trapping on coastal martens in Oregon will continue at a similar level, both currently and into the future, because the best available data do not suggest that either fur trapping effort or impacts are likely to change. Additionally, of note for California, we expect that nearly all coastal martens that are accidentally captured in box traps (body-gripping traps are illegal in California) set for other furbearer species, or that are live-trapped for

research purposes, will be released unharmed. As a result of this best available information for Oregon and California, we have determined that fur trapping, overall, does not have a significant population-level impact across the DPS's range and does not rise to the level of a threat.

Trapping for Research Purposes

Based on the analysis contained within the Species Report, we consider the potential impacts of live-trapping and handling for research purposes on coastal marten populations as discountable. We came to this conclusion based on the limited distribution of marten research projects in the three extant population areas (currently only a single project in the western half of the coastal northern California population area where no martens were injured or killed during live-trapping), and based on the strict trapping and handling protocols that must be adhered to by coastal marten researchers to ensure the safety of study animals. Available information does not suggest that there would be any change to the level of anticipated impacts of live-trapping and handling for research purposes into the future, and, therefore, we find that the potential impacts to the coastal marten from trapping for research purposes do not rise to the level of a threat.

Factor C—Disease or Predation.

Disease

Numerous pathogens (e.g., canine distemper, canine parvovirus, toxoplasmosis) are known to cause severe disease in mustelids. Infected domestic dogs that are allowed to roam within an extant marten population area could expose martens to lethal pathogens. Fur trappers could capture an infected carnivore (e.g., marten, fisher, gray fox, bobcat) and inadvertently spread the disease to martens through contaminated traps. Marten researchers could also transfer lethal pathogens within and between extant population areas if traps and track-plate boxes are not disinfected after exposure to any carnivore species, including coastal martens.

An outbreak of a lethal pathogen within any of the three extant coastal marten populations could occur. Several serious pathogens have been detected in the related fisher less than 9 km (5.6 mi) from the nearest verifiable marten detection within the coastal northern California population (Brown *et al.* 2008, entire), suggesting that martens could be exposed by infected juvenile fishers that disperse from their natal area into the coastal marten population area. However, despite possible exposure to pathogens, no outbreaks of diseases have been detected in coastal martens, and we have no evidence to suggest that disease is currently present in any of the coastal marten populations.

The best available data do not indicate that disease has impacted coastal martens at any point in time in the past or currently. The prevalence of past exposure to lethal pathogens within the coastal northern California population and the coastal Oregon populations has not been demonstrated through a serosurvey (i.e., a screening test of the

serum of a marten to determine susceptibility to a particular disease). Additionally, if the known extant populations are disjunct from one another, as suggested by Slauson and Zielinski (2009, pp. 35–36), this would be beneficial in terms of reducing the ease of transmission of disease between the populations, should an outbreak occur. Thus, at this time, the best available data do not indicate that a disease outbreak has had, or is likely to have, a significant population-level effect on coastal martens.

In sum, there are currently no indications of disease in coastal marten populations. If an outbreak of a serious disease should occur, it could have a significant impact on the affected population. However, based upon the best available scientific and commercial data as presented in the Species Report and summarized here, there is a low probability that a disease outbreak may occur. We anticipate that if there should be an outbreak, it will likely have a low effect on all three coastal marten populations combined, as the distance between them makes it unlikely that the effects of such an outbreak would spread. Thus, we have determined that disease has a low-level population impact across the coastal marten's range and, therefore, does not rise to the level of a threat currently or into the future.

Predation

Predation is a natural ongoing source of mortality for the coastal marten and would not be expected to negatively impact the viability of marten populations in coastal Oregon and coastal northern California unless annual predation rates, combined with all

other mortality sources, exceed annual juvenile coastal marten recruitment rates (estimated at 50 percent for the coastal marten; Slauson *et al.*, In prep.(a)). At this time, the only documented coastal marten predators are bobcats (Slauson *et al.* 2014, unpubl. data). However, additional predator species have been documented for other marten species and populations:

(1) Strickland *et al.* (1982, p. 607) summarized reports of American martens being preyed upon by coyotes, fishers, red foxes, cougars, golden and bald eagles (*Aquila chrysaetos*, *Haliaeetus leucocephalus*), and great horned owls (*Bubo virginianus*).

(2) Bull and Heater (2001a, p. 3) conducted a study in northeastern Oregon and documented 18 martens (i.e., *Martes caurina vulpina*) killed by predators: 44 percent by bobcats, 22 percent by raptors, 22 percent by other martens, and 11 percent by coyotes.

Historical coastal marten predation rates are unknown, although the historical assemblage of predator species was likely similar to the current assemblage. It is possible that human-caused changes in vegetation composition, vegetation distribution, and extensive road building over time have increased predator densities and distribution within the range of the coastal marten. These changes in vegetation and infrastructure provide more access and avenues in which predators can exploit their prey base, especially in forested areas that were once undisturbed with extensive shrub cover for prey, such as martens, to escape or find shelter. For example, in coastal northern California, fisher and gray fox have both maintained their interior distributions but appear to have expanded their distributions in coastal redwood forest habitat concurrently with the dramatic decline in the distribution of coastal martens (Slauson and Zielinski 2007, p.

242). Another recent study within coastal northern California suggests that bobcats and gray foxes frequent roads in forests dominated by redwoods (Slauson and Zielinski 2010, pp. 77–78); the same is likely true for other forest types throughout the DPS's historical range in coastal Oregon and coastal northern California, but has not been confirmed. Slauson and Zielinski (2010, pp. 77–78) indicate that roads may be facilitating the presence and abundance of these predator species in dense-shrub landscapes and increasing the risk of intraguild predation on coastal martens. Therefore, past logging practices that reduced the complexity of the herb and shrub layers, in combination with existing roads, may have facilitated an increase in the distribution of predators within the range of coastal marten, thus potentially increasing the likelihood that coastal martens could encounter a predator.

Predation of coastal martens has been studied recently. Since the fall of 2012, researchers have radio-tracked up to 23 coastal martens within the western portion of the coastal northern California extant population area to determine survival rates and cause of death. Data indicate a total of nine coastal marten mortalities, all killed by bobcats (Slauson *et al.* 2014, unpubl. data). Although these data would appear to indicate a 39 percent annual mortality rate, the annual mortality rate was estimated to be 33 percent due to several martens tracked for more than a year that were later found dead (Slauson *et al.* 2014, unpubl. data). The mortalities have also occurred within areas where bobcats are considered more abundant and fishers have been documented, particularly where extensive logging and road building within suitable coastal marten habitat have occurred (Slauson 2014, pers. comm.). No other records of coastal marten predation have been

documented nor conducted, including within coastal Oregon.

Predation is identified as a natural stressor (i.e., part of the natural condition in which the coastal marten has evolved). Human activities (such as vegetation management and road building) may increase the abundance and distribution of predators within coastal marten home ranges. The preliminary home ranges of all nine dead coastal martens mentioned above contained relatively large amounts of recently logged forest, compared with the home ranges of radio-collared coastal martens that are still alive (Slauson 2014, pers. comm.), suggesting that disturbed areas may result in greater predation rates or that undisturbed areas, which harbor suitable habitat features for escape from predators, are likely preferred. In addition, all nine dead coastal martens were found within 100 m (328 ft) of a road. As described in the "Population Biology and Dynamics" section of the Species Report (Service 2015, p. 12), Slauson *et al.* (In prep.(a)) estimated annual juvenile coastal marten survival at 50 percent, which suggests that the observed 33 percent annual mortality rate of coastal martens from predation may be sustainable.

The population-level impact of predation within the three coastal marten extant population areas is currently unknown. Data are available only for the coastal northern California population where a sample of 23 individuals were radio-tracked and 9 of those were found predated upon by bobcats, indicating a 33 percent predation rate (Slauson *et al.* 2014, unpubl. data). Similar information does not exist for the Oregon populations. However, the best available scientific and commercial data indicate that predation is

occurring to an unknown degree as an ongoing natural process across the range of the DPS.

As noted above, a 33 percent annual predation rate is expected to be sustainable when compared with an annual juvenile coastal marten survival rate of 50 percent; thus, predation would not likely result in a population-level impact. Therefore, based on the best available data, we find that predation has a low-level population impact for all three extant coastal marten populations. The best available data indicate that predation is a natural process and the level of predation is not expected to increase in the future. Based on the analysis contained within the Species Report and summarized above, we have determined that predation does not rise to the level of a threat, given that it is a natural phenomenon and appears to be occurring at a sustainable level.

Factor D—The Inadequacy of Existing Regulatory Mechanisms.

Existing regulatory mechanisms that affect coastal martens include laws and regulations promulgated by the Federal and individual State governments. Federal and State agencies manage approximately 31 and 5 percent, respectively, of the lands within the coastal marten's range, including a total of approximately 57 percent (13,388 km^2 (5,169 mi^2)) of the currently available suitable habitat (high, medium, and low quality) throughout the range of the coastal marten (see Table 8.2 in the Species Report (Service 2015, p. 37)). Tribal governments, as sovereign entities, have their own system of laws and regulations on tribal lands. Principal stressors acting on coastal martens for which

governments may have regulatory control include injury or mortality due to fur trapping, habitat modification or loss, and legal uses of pesticides, including anticoagulant rodenticides (ARs). These regulations differ among government entities, are explained in detail in the Species Report (Service 2015, pp. 78–96), and are summarized below.

Federal

All Forest Service and BLM lands within the range of the coastal marten are managed under the NWFP, which was adopted in 1994, to guide the management of 97,124 km^2 (37,500 mi^2) of Federal lands in portions of western Washington, Oregon, and northwestern California. The NWFP amends the management plans of National Forests and BLM Districts within the range of the northern spotted owl (*Strix occidentalis caurina*), representing a 100-year strategy intended to provide the basis for conservation of the northern spotted owl and other late-successional and old-growth forest-associated species (Forest Service and BLM 1994a, 1994b). This regional plan provides for retention and recruitment of older forests, and provides for spatial distribution of this type of habitat that will benefit late-successional forest-dependent species, including the coastal marten. The amount of late-successional coniferous habitat on Federal lands removed since implementation of the plan is substantially lower than pre-implementation levels (Kennedy *et al.* 2012, p. 128). Activities such as timber harvest and thinning, fuels reduction treatments, and road construction (see "Vegetation Management" and "Development" under *Factor A*, above) may occur in certain areas known as matrix lands (i.e., limited areas delineated specifically to allow for programmed

future timber harvest), which may result in some reduction of habitat and habitat connectivity for the coastal marten. However, the future loss, degradation, or fragmentation of suitable coastal marten habitat on Federal lands from these activities is expected to be low given the limited amount of matrix land allocation. Future increases in the amount and distribution of forest habitat suitable for coastal martens is expected to occur either through ingrowth in Federal Reserves, or through forest management activities designed to accelerate the development of late-seral characteristics within the coastal marten's range.

The coastal marten is currently treated differently on Federal lands in Oregon as compared to California. In Oregon, the coastal marten is not considered a sensitive species on Forest Service and BLM lands. However, the Forest Service (Region 6) has added the marten to its draft sensitive species list that is expected to be finalized in 2015 (U.S. Department of Agriculture, Forest Service 2014, p. 5), and BLM (Medford and Roseburg Districts) is also working to add the marten to its sensitive species lists (Hughes 2015, pers. comm.). In California, the coastal marten is a sensitive species on Forest Service lands, but not on BLM lands. Federal protections afforded the coastal marten as a sensitive species on Forest Service lands in California largely depend on best management practices and conservation efforts outlined in their Land and Resource Management Plans (LRMPs), and on-site-specific project analyses and implementation.

Potential exposure of coastal martens to ARs has not yet been studied, but to date we have incidental evidence of sublethal exposure in at least one individual (see

"Exposure to Toxicants" under *Factor E*, below). The use of rodenticides is regulated under the Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (7 U.S.C. 136 *et seq*.), via the registration of labels by the U.S. Environmental Protection Agency. Each label describes the permitted use for an individual rodenticide product and must be supported by rigorously collected and analyzed efficacy and environmental safety data. However, it is not clear how well those regulations prevent wildlife (including coastal martens) exposure to legal uses of these rodenticides. Coastal martens may also be exposed to rodenticides used illegally in the form of rodenticide applications on illegal marijuana grow sites. Law enforcement efforts occur in both Oregon and California in an attempt to eradicate suspected illegal marijuana grow sites, but it is unknown how effective such measures are at reducing the exposure of martens to rodenticides. At this time, as described below, the best available data do not indicate population- or rangewide-level impacts to coastal martens from legal or illegal use of rodenticides.

The Forest Service has extensive policy on the use of rodenticides (Forest Service Manual 2670.32), and the Forest Service Manual (Forest Service 2005, Chapter 2600) contains legal authorities, objectives, policies, responsibilities, instructions, and guidance needed on a continuing basis by Forest Service line officers and primary staff to plan and execute assigned programs and activities. In addition, BLM policy (BLM Manual 9011-Chemical Pest Control) regulates the use of rodenticides and other pesticides on their ownership. Queries to the BLM and Forest Service in Oregon confirm they do not use anticoagulant rodenticides on their ownership, although some use of strychnine for rodent control is employed on Forest Service land (Standley 2013, pers. comm.; Bautista 2013,

pers. comm.).

States of Oregon and California

Forest practice rules vary greatly between Oregon and California, with no explicitly stated coastal marten protections specified in either State. However, retention of some number of snags and green trees in harvest units is a ubiquitous requirement in managed forests throughout the range of the coastal marten (State, Federal, and private lands) (e.g., Oregon forest practice rules (Oregon Administrative Rules (OAR) Chapter 629, Division 600); CAL FIRE forest practice rules (Title 14, California Code of Regulations, Chapters 4, 4.5, and 10; Forest Service and BLM 1994a, 1994b)). The coastal marten is not listed under the California Endangered Species Act (CESA) or as a State "fully protected" species and thus does not receive protections available under those statutory provisions. In terms of effects to coastal marten habitat or incidental harm to coastal martens from timber harvesting or other types of land-disturbing projects, the State of California has existing regulations that act in combination to disclose, avoid, or mitigate environmental degradation, the latter two situations of which could potentially result in benefits to coastal marten habitat. Cumulative effects analyses for listed and non-listed species, such as coastal marten, are required in both the California Environmental Quality Act (CEQA) and the California forest practice rules.

Structures that are retained (e.g., some level of snags and green trees) under existing forest practice rules typically do not meet the minimum size used by coastal

martens (Schmidt 2014, pers. obs.; Slauson 2014, pers. obs.). Where these features are large enough, they may provide future denning and resting sites provided they have the appropriate structural attributes (such as cavities and large limbs) and the surrounding forest is allowed to develop the necessary canopy cover, dense shrub understory, and prey base to support coastal martens in the long term. Short rotations of industrial forest management rarely allow this to happen, as compared to areas where management is for longer rotations or designed to develop older stands (e.g., old-forest structure management on Oregon State Forests) that retain these legacy features that may facilitate coastal marten habitat development.

Protection measures for riparian areas are also a widespread standard on managed forests throughout the range of the coastal marten, with larger buffers and more stringent timber retention requirements typically provided on Federal and State lands as compared to private lands. Retention areas to meet other management goals are also found across ownerships (e.g., anchor habitats on Oregon State Forests, occupied site buffers on multiple ownerships, Watercourse and Lake Protection Zones on private land in California). Although many of these retained areas are not large enough to support a coastal marten home range, they do provide patches of structural features that may allow coastal marten movement across the landscape and facilitate dispersal between larger blocks of coastal marten habitat. This may be particularly valuable where State lands lie between large blocks of Federal lands managed as late-seral habitat. Additionally, the Oregon Department of Forestry calls for managing 30 to 50 percent of their State Forests in northwest Oregon for layered and old-forest structural conditions such as larger trees,

multiple canopy layers, diverse understories and shrub layering, and diverse structural features such as downed wood and snags (ODF 2010, pp. 4–48, C-1 to C-24). These lands represent a small proportion of currently occupied habitat and are mostly located outside of existing coastal marten population areas; however, these areas may benefit coastal martens in the future as they are allowed to develop into a structural condition more suitable to martens.

Coastal martens can be legally harvested/trapped for fur in Oregon but not in California (see "Trapping" under *Factor B*, above). Within Oregon, coastal martens are listed (by the Oregon Department of Fish and Wildlife) as a sensitive species in the vulnerable category and as a species of conservation concern, but neither of these designations has associated regulatory mechanisms. Rather, these designations are used to encourage voluntary actions to improve a taxon's status or prevent population declines. Within California, coastal martens may not be intentionally harvested or trapped for fur or otherwise killed in California; although injury or mortality may occur when coastal martens are incidentally captured in traps set for other species, we expect incidental captures to be released unharmed. The use of body-gripping traps is prohibited and enforced in California, but injury or mortality of coastal martens is likely to occur during illegal fur trapping using the banned body-gripping traps. The extent of illegal fur trapping and mortality of coastal martens in Oregon and California is unknown. In general, legal trapping (such as that for research) is unlikely to result in injury or mortality to coastal martens because of the mandatory use of live traps and strict trapping and handling procedures.

Summary of Factor D

Overall, existing Federal and State land-use plans include some general conservation measures for northern spotted owl habitat that are not specific to coastal martens but nonetheless provide a benefit to the coastal marten, for example through the maintenance and recruitment of late-successional forest and old-growth habitat. Most management plans address structural habitat features (e.g., snags or downed wood retention) or land allocations (e.g., Oregon Department of Forestry's no-cut riparian buffer; NWFP's protections of a network of late-successional forest habitat connected by riparian reserves) that contribute to the coastal marten's habitat. These land-use plans are typically general in nature and afford relatively broad latitude to land managers, but with explicit sideboards for directing management activities. Federal regulatory mechanisms have abated the large-scale loss of late-seral coniferous forest habitat. Much of the land in Federal ownership across the range of the coastal marten is managed for interconnected blocks of late-successional forests that are likely to benefit martens. Timber harvest has been substantially reduced on Forest Service and BLM lands within the NWFP area, and existing management is designed to maintain or increase the amount and quality of late-successional or old-growth forest that provides marten habitat and aids in connecting populations. Management of State lands for scattered parcels of older forest or habitat retention for other late-successional species may also facilitate coastal marten movements across the landscape or provide future habitat as some areas are allowed to develop into older stands. Outside of public (State and Federal) ownership,

forest practice rules provide no explicit protection for martens and limited protections for habitat of value to martens. While some structural retention and limited buffers may retain structural features desirable for martens on private lands, the short harvest-rotation periods reduce the likelihood that the surrounding stand will develop to a condition that makes these features suitable for long-term use by martens.

Based on the analyses contained within the Species Report (Service 2015, pp. 81–94) and summarized above on the existing regulatory mechanisms for the coastal marten, we conclude that the best available scientific and commercial information does not indicate that the existing regulatory mechanisms are inadequate to address impacts to coastal martens from the identified stressors.

Factor E—Other Natural or Manmade Factors Affecting the Continued Existence of the Species.

Collision With Vehicles

Collision with vehicles is a known source of mortality for coastal martens currently and is expected to continue into the future, given the presence of roads within the range of the DPS. A low density of roads with heavy traffic traveling at high speeds (greater than 45 miles per hour) and infrequent reports of road-killed martens within all three extant population areas suggest that few martens die from vehicle collisions each year.

No coastal marten road kill mortalities have been reported recently (since 1980) from within the coastal southern Oregon and coastal northern California population areas, both of which are areas that do not contain long segments of heavily used highway (although it is possible that road kill on any light-use roads in remote areas may not be discovered by humans before being consumed as carrion). A total of 14 coastal marten mortalities have been documented from vehicle collision since 1980 (over a 34-year period) within or near the coastal central Oregon population area, suggesting a low annual mortality rate from vehicle collisions. Collisions with vehicles were and continue to be expected within the coastal central Oregon population because of the presence of U.S. Highway 101 within this population.

We expect that in the future a small number of coastal martens will be struck by vehicles, especially dispersing juvenile coastal martens that must reach unoccupied suitable habitat for establishment of a home range. However, the best available information does not suggest any significant increases in vehicular traffic or new highways (consistent with the information available on potential development-related impacts (see "Development" under *Factor A*, above)) to be built in areas where martens occur. Therefore, we conclude the impact of vehicle collisions on coastal martens to continue at similar levels into the future. Any potential population impacts from individual coastal marten mortalities as a result of collisions with vehicles are difficult to estimate; we have no evidence of mortalities due to collisions with vehicles in the coastal northern California or coastal southern Oregon populations, and lack any population size

estimate for the coastal central Oregon population area where some mortalities have been documented over an extended period of time. The best available data indicate, however, that across the DPS relatively few coastal martens are killed as the result of collisions with vehicles. Based on the information presented above and in the Species Report (Service 2015, pp. 52–53), we find that collision with vehicles presents a low-level impact on all three coastal marten populations (i.e., impacts to individual coastal martens as opposed to populations); therefore, this stressor does not rise to the level of a threat.

Exposure to Toxicants

An emerging stressor to coastal martens is the widespread use of anticoagulant rodenticides (ARs) and other pesticides (e.g., organophosphates, carbamates, or organochlorines) at both legal and illegal marijuana grow sites, and the potential individual- and population-level impacts to species, including coastal martens, that are exposed to toxicants at these sites. We note that recent efforts to determine the prevalence of ARs in carnivore populations have focused on fisher populations in California due to the conservation status of that species and because marijuana grow sites are common in California. As information specific to coastal martens is largely lacking, for the purposes of the analysis in our Species Report (Service 2015, pp. 54–61), we examined this fisher information to help evaluate the potential impacts ARs might have on coastal marten populations in coastal northern California and coastal Oregon.

Anticoagulant rodenticides were created to kill small mammals considered pests,

including commensal rodents such as house mice (*Mus musculus*), Norway rats (*Rattus norvegicus*), and black rats (*R. rattus*) in and around residences, agricultural buildings, and industrial facilities, and agricultural pests such as prairie dogs (*Cynomys* sp.) and ground squirrels (*Spermophilus* sp.) in rangeland and near crops. Anticoagulant rodenticides bind to enzymes responsible for recycling vitamin K, thus impairing the animal's ability to produce several key blood clotting factors (Berny 2007, p. 97; Roberts and Reigart 2013, pp. 173–174).

Anticoagulant rodenticide exposure is manifested by such conditions as bleeding nose and gums, extensive bruises, anemia, fatigue, and difficulty breathing. Anticoagulants also damage the small blood vessels, resulting in spontaneous and widespread hemorrhaging. There is often a lag time of several days between ingestion and death, if lethal doses are ingested (Berny 2007, pp. 97–98; Roberts and Reigart 2013, pp. 174–175). Evidence from laboratory and field studies for several mammalian and avian species suggests that various pesticide (including rodenticide) exposures:

(1) Reduce immune system function (Repetto and Baliga 1996, pp. 17–37; Li and Kawada 2006, entire; Zabrodskii *et al.* 2012, p. 1);

(2) Are associated with a higher prevalence of infectious disease (Riley *et al.* 2007, pp. 1878, 1882; Vidal *et al.* 2009, p. 270);

(3) Cause transient hypothermia (Ahdaya *et al.* 1976, entire; Gordon 1984, p. 432; Grue *et al.* 1991, pp. 158–159), which may contribute to an increase in mortality rates (Martin and Solomon 1991, pp. 122,126); or

(4) Possibly impair an animal's ability to recover from physical injury (Erickson

and Urban 2004, pp. 90, 100, 184, 188, 190–191).

Exposure to ARs, resulting in death in some cases, is documented in many mammalian predators (e.g., Alterio 1996, entire; Shore *et al.* 1999, entire; Riley *et al.* 2007, entire; Gabriel *et al.* 2012, entire; Quinn *et al.* 2012, entire), but such information is unavailable for coastal martens. However, there is wide variability in lethal and sublethal levels of ARs exhibited among and within taxonomic groups (Gabriel *et al.* 2012, p. 11), and it is unknown if stressors or injuries could predispose all species to elevated mortality rates (e.g., Gabriel *et al.* 2012, p. 10 for fishers). In one California study of two fisher populations, the majority (84 percent) of fishers (closely related to martens) tested positive for the presence of ARs, but at sublethal levels (Thompson *et al.* 2013, p. 6; Gabriel *et al.* 2012, p. 5). Additionally, several fishers have recently been confirmed to have died from acute poisoning from ARs on the Hoopa Reservation (Gabriel *et al.* 2012), which is located less than 9 km (5.6 mi) south of the coastal marten's extant population area in coastal northern California. However, Gabriel *et al.* (2012, p. 6) determined that AR exposure was the direct cause of death for only a small proportion (4 of 58 individuals found dead within 2 isolated California populations) of those fishers examined.

Little information exists specific to coastal marten exposure or response to ARs. Coastal martens within the California population and likely the coastal Oregon populations may be exposed to ARs currently or in the future in those areas where marijuana grow sites are located (which currently is known to be a fraction of the coastal

marten's range) based on: (1) The proximity of the closely related fisher with confirmed exposure to ARs, including in areas as close as 9 km (5.6 mi) from the coastal northern California population; (2) the broad use of ARs at illegal marijuana cultivation sites, which have been documented to occur within or adjacent to portions of both the marten's coastal northern California and coastal southern Oregon population areas; and (3) the potential continued use of ARs at legal grow sites and other areas within the range of the coastal marten where agricultural pesticide use occurs. Although the presence or use of ARs is documented in many areas throughout coastal northern California and into portions of Oregon (Higley *et al.* 2013, p. 2; Oregon High Intensity Drug Trafficking Area 2013, entire), to date, only one record of a positive exposure exists within the range of coastal martens that demonstrates exposure to ARs. This information was obtained from non-related, coincidental research occurring in the coastal northern California extant population area in 2014; of six coastal martens assessed, one tested positive for AR exposure with a sublethal concentration (Slauson 2014, unpubl. data). The individual that tested positive was confirmed killed by a bobcat. It is unknown whether the sublethal dose of ARs may have predisposed that coastal marten to predation. This information about potential exposure of coastal martens to ARs was collected on private lands and involved a small sample size (six coastal marten individuals) in one portion of the coastal northern California extant population area; thus, it is not necessarily representative of the levels of exposure throughout other land ownership areas within the remainder of the DPS. The sublethal AR exposure of this single coastal marten is the only data available to us regarding potential exposure of coastal martens to ARs; the best available information does not indicate any population- or rangewide-level impacts of

AR exposure on coastal martens.

Overall, illegal and legal marijuana cultivation sites (and use of ARs and other pesticides) are present within or near all three coastal marten populations, although the probability of exposure varies between them. At this time we estimate that the prevalence of illegal marijuana cultivation sites (based on data associated with eradicated cultivation sites) occurs within approximately 5 percent of the coastal central Oregon population area, 25 percent of the coastal southern Oregon population area, and 40 percent of the coastal northern California population area (Service 2014, unpubl. data). However, the incidence of toxicant exposure that may result for coastal martens and the potential population-level effects are largely unknown given testing for exposure to ARs began only recently. We note significant uncertainty as to the severity of impact that this stressor may have at the population- and rangewide levels on coastal marten given that the best available data are minimal regarding potential exposure to this stressor and any consequent effects on coastal martens at this time, including the lack of information regarding potential sublethal effects. There are few samples to fully determine coastal marten exposure rates to ARs, and no tests on martens to determine sublethal exposure rates and effects. The recent legalization of marijuana in the State of Oregon adds an additional element of uncertainty to evaluation of this stressor, as it is unknown whether or how this may potentially affect exposure rates (for example, whether there may be a trend toward indoor grow operations, which would potentially reduce exposure of wildlife to ARs). Based on the analysis contained within the Species Report and summarized above, we find the population-level impact from exposure to toxicants to be

low both currently and into the future, although a higher (medium-level) impact may occur for the coastal northern California population as a result of higher prevalence of illegal marijuana cultivation sites. The best available information does not suggest that these impacts rise to the level of a threat, primarily based on the available information on levels of known marten exposure to ARs and lack of evidence that ARs are having a population-level effect.

Small and Isolated Population Effects

Small, isolated populations are more susceptible to impacts overall, and relatively more vulnerable to extinction due to genetic problems, demographic and environmental fluctuations, and natural catastrophes (Primack 1993, p. 255). That is, the smaller a population becomes, the more likely it is that one or more stressors could impact a population, potentially reducing its size such that it is at increased risk of extinction. We therefore evaluated information suggesting that the currently known populations of coastal martens may be small or isolated from one another to the degree that such negative effects may be realized in the DPS.

The best available data suggest coastal marten distribution has contracted markedly in California and southern Oregon since the early 20th century. At present there are three known extant populations of coastal martens in California and Oregon; however, much of coastal Oregon has not been systematically surveyed. Of these known populations, the coastal northern California population is the only population for which

size estimates are available. Based on multi-state occupancy modeling, Slauson *et al.* (2009b, p. 13) estimated that the abundance of coastal martens in the coastal northern California population area is low (i.e., fewer than 100 individuals in 2008). Comparing areas sampled in 2008 to those sampled in 2000 to 2001, sample unit occupancy had declined by an estimated 42 percent (Slauson *et al*. 2009b, p. 10). Whether this change may have been part of a natural population fluctuation or was related to human-caused factors is unknown (Slauson *et al.* 2009b, p. 14). Although small in size, preliminary occupancy estimates for 2012 (which are unchanged from 2008) suggest no further changes in marten population abundance (Slauson *et al.* 2014, unpubl. data).

The abundance and trend of coastal marten populations in coastal Oregon is unknown; standardized survey efforts for martens in central and southern Oregon began in 2014. In the coastal central Oregon population area, at least one marten was detected in 2014, and six martens have been detected in 2015 in the first weeks of surveys (Moriarty 2015, pers. comm.). In addition, surveys just beginning in southern coastal Oregon have yielded a marten detection (Moriarty 2015, pers. comm.). Surveys are continuing at the time of publication of this document.

Slauson and Zielinski (2009, p. 36) describe the three known extant coastal marten populations as disjunct. Verified marten detections have clustered into the three extant population areas recognized in this document, which are geographically separated. The degree of functional connectivity between the known populations is not well understood due to insufficient survey effort in many areas, particularly in coastal Oregon

(Service 2015, p. 29). There are some detections of martens occurring between the coastal northern California and coastal southern Oregon populations (Service 2015, p. 31, Figure 8.2(B)). Habitat modeling suggests connectivity of suitable habitat between these populations (Service 2015, pp. 25-26), and there are no known barriers to dispersal between them. Suitable habitat is more limited and of lower quality between the coastal southern Oregon and coastal central Oregon populations, but not entirely discontinuous (Service 2015, pp. 25-26). Survey efforts have also been more limited in this area to date (Service 2015, p. 29). Marten surveys are largely lacking from coastal central and coastal northern Oregon, although habitat modeling suggests conditions suitable for additional martens that could support the existing known populations (Service 2015, p. 29–30, 34).

Surveys designed to determine potential occupancy by coastal martens (for example, targeting areas of suitable habitat large enough to support multiple home ranges) may not necessarily detect animals moving between populations. Although not equivalent in function to large areas of contiguous habitat, fragmented patches of forest sufficient to provide corridors for dispersal of individuals can play an important role in maintaining assemblages of old-growth forest mammals (Perault and Lomolino 2000, pp. 418–419). The potential habitat connectivity between known populations of coastal martens and their capacity to travel long distances at least on occasion suggests that the geographically disjunct nature of coastal marten populations is not necessarily a barrier resulting in isolation. As described earlier, the majority of juvenile martens disperse relatively short distances from their natal areas, generally less than 15 km (9.3 mi) (Phillips 1994, pp. 93–94). The distance between known extant coastal marten

populations exceeds the mean maximum juvenile dispersal distance for martens in general (15 km (9.3 mi); Phillips 1994, pp. 93–94). The distance between known extant populations exceeds this distance, but is within the maximum observed dispersal capability of martens, ranging from 40 to 80 km (25 to 50 mi) (Thompson and Colgan 1987, pp. 831–832; Broquet *et al*. (2006, pp. 1690, 1695), up to 149 km (92 mi) or greater (Slough 1989, p. 993; Kyle and Strobeck 2003, p. 61). The relatively continuous extent of some limited area of marten habitat, though much of it is low in quality, and dispersal capabilities of martens indicates that movement between coastal marten populations is possible, acknowledging that individuals seeking to traverse areas of regenerating forest face reduced probability of survivorship (Johnson *et al*. 2009, p. 3366). For this reason, areas that may provide for safe corridors of movement, such as riparian areas retained under State forest practice rules (see *Factor D*, above), may play an important role in facilitating connection between larger areas of suitable habitat for coastal martens.

In most cases, genetic interchange need occur only occasionally between populations (a minimum of 1 migrant per generation, possibly up to 10) to offset the potential negative impacts of inbreeding (e.g., Mills and Allendorf 1996, entire; Wang 2004, entire). In addition, depending on population sizes and the distance between them, the ability of even a few individuals to move between population areas can preserve the potential for recolonization or augmentation (Brown and Kodric-Brown 1977, entire). Genetic evidence from studies of martens in fragmented landscapes suggests that despite separation of populations by large distances, up to several hundred kilometers,

little genetic differentiation is observed (Broquet *et al*. 2006, p. 1690, citing Kyle and Strobeck 2003, pp. 60-61). Broquet *et al*. (2006, p. 1690) suggest this weak genetic structure is indicative of great dispersal capacity in martens, and their results suggest that a few successful long-distance dispersers create enough gene flow in marten populations to significantly reduce genetic differentiation that might otherwise result from isolation by distance (Broquet *et al*. 2006, p. 1695).

Based on all of these consideration, despite the relatively geographically disjunct nature of the known extant marten populations, we do not have evidence to suggest that the populations are likely entirely isolated from one another to the degree that we would expect the manifestation of significant negative effects that could potentially arise in small, isolated populations, such as inbreeding depression. We recognize that habitat quality and contiguity could be improved between the extant population areas, and indications are that habitat recruitment through management of Federal lands under the NWFP should contribute to improved connectivity. Despite room for improvement, at this point in time, the best available information suggests that the extant population areas are within the dispersal capabilities of martens and the habitat suitability model indicates some connectivity between populations, at least sufficient to provide for occasional genetic interchange. We note that more detailed information is needed regarding the size and demographics of coastal marten populations, as well as the capability of intervening areas of habitat to support dispersing individuals, in order to fully understand whether the known populations are faced with any challenges as a result of the present degree of connectivity between them.

Although coastal martens are likely reduced in abundance or distribution relative to their historical numbers and range, there is no empirical evidence that any current populations of coastal marten are in decline. Based upon the analysis contained within the Species Report and summarized above, the best available information indicates that the coastal northern California population totals fewer than 100 individuals (Slauson *et al.* 2009b, p. 13). Although small in size, the estimated number of individuals that comprise the coastal northern California population of martens appears to have remained the same in recent years based on survey data collected since 2008.

Abundance and trend estimates are not available for the two coastal Oregon populations, so it is unknown whether these populations might be considered small. Coastal martens have likely been reduced in abundance relative to their historical numbers, although Zielinski *et al.* (2001, p. 487) suggest that out of the three west coast States, coastal martens are likely most common in Oregon. These researchers note, however, an inability to evaluate the status of martens in the coastal mountain ranges of central and northern Oregon due to insufficient historical or contemporary data (Zielinski *et al*. 2001, p. 486). Data from systematic surveys continue to be limited or nonexistent in coastal northern and coastal central Oregon, leading to an inability to determine population size, trend, or distribution in these areas at this time. However, as noted above, recently initiated surveys in coastal central and coastal southern Oregon did result in seven total detections of coastal martens in the first weeks of effort in 2015 (Moriarty 2015, pers. comm.), and surveys are continuing at the time of this publication (Moriarty

2015, pers. comm.).

The three known extant populations of coastal martens are disjunct. While this characteristic does have some potential negative effects (e.g., potential impacts from other stressors may be exacerbated), overall it places the DPS at a diminished risk of extinction due to small population size effects (known small population for coastal northern California and unknown for coastal Oregon populations) because it is unlikely that any stressor will simultaneously affect all three populations. In addition, although the populations may be discontinuous, we do not have evidence to suggest that populations are entirely isolated beyond the potential dispersal range known for martens such that negative small population effects are likely to be realized. Therefore, based on the best available data, we have determined that small or isolated population size effects do not rise to the level of a threat either currently or in the future.

Cumulative Effects

We estimate the potential impact of each stressor described above acting alone on coastal marten individuals, populations, and suitable habitat. However, coastal marten populations and suitable habitat can also be affected by all stressors acting together or some of the identified stressors acting together (particularly medium-level impacts, as described in detail in the Species Report and summarized above). The combined effects of those stressors could impact populations or suitable habitat in an additive or synergistic manner. Any given stressor could impact individuals, a portion of a

population, or available suitable habitat to varying degrees or magnitude, and alone, a stressor may not significantly impact coastal martens or their habitat.

Based on our analysis of all stressors that may be impacting coastal martens or their habitat, including, to be conservative, taking into account effects associated with potential small or isolated populations (noting that the coastal northern California population is known to be small and information is not available to indicate if the coastal Oregon populations may be small), it is likely that if any cumulative impacts occur, they would do so under the following three scenarios:

(1) A projected increase in the frequency and size of wildfires within the coastal southern Oregon and coastal northern California portions of the DPS's range due to climate change model projections of a warmer, drier climate in the future, which could also change vegetation structure.

(2) A potential increase in coastal marten mortality rates from predation, disease, fur trapping in Oregon, and collision with vehicles due to reduced marten fitness after sublethal exposure to toxicants found at marijuana grow sites, although levels of exposure remain unknown.

(3) Increased coastal marten predation rates due to an increased abundance of intraguild predators (e.g., bobcats, fishers) resulting from vegetation management activities that improve habitat suitability for these marten predators by decreasing shrub densities.

Here we consider the impacts of each of these potential cumulative effect

scenarios:

Models of climate change predict potential increases in wildfire frequency and size within the coastal southern Oregon and coastal northern California portions of the DPS. As described in our analysis in "Wildfire" under *Factor A*, above, we expect that wildfire impacts are likely to occur throughout the range of the coastal marten at a level similar to the historical impacts that have occurred within each extant population area between 1984–2012 (roughly 30 years), and we expect that fire frequency, size, and severity in the future will be fairly similar or slightly higher in some areas based on climate change projections. Based on these 30 years of data, we can reasonably estimate that these effects will continue with the same approximate level of impact throughout the DPS into the next 30 years, although they may be slightly higher in the coastal southern Oregon and coastal northern California population areas. Additionally, we do not have information that climate change will result in vegetation changes that will make significant portions of currently occupied coastal marten habitat unsuitable. Therefore, the best available data at this time do not suggest that the cumulative effects of wildfire and climate change rise to the level of a threat to the DPS overall for the following reasons:

(1) Although climate change models generally predict warmer, drier conditions in the future, the coastal marten primarily inhabits forests that are relatively less vulnerable to such changes. The overall continued presence of relatively moist habitat conditions for coastal marten habitat, primarily along the western coast, including overall cooler, moist summer conditions, moderate the dry conditions that promote fire ignition and spread.

(2) Moderate- and high-quality habitat for coastal martens has remained following recent large wildfires (i.e., wildfires that have burned at mixed severities (LANDFIRE 2008a; LANDFIRE 2008b; LANDFIRE undated(a))); these fires have not resulted in extensive stand-replacement within the coastal marten's range.

(3) Neither adverse changes to coastal marten habitat through potential vegetation changes nor the loss of habitat from future wildfires is expected to be significant, nor is the combined effect of these two potential stressors.

Sublethal effects of anticoagulant rodenticides have been demonstrated for many species (see discussion in the Species Report (Service 2015, p. 57)), and can include reduced blood clotting abilities and excessive bleeding. Sublethal exposure to ARs has been shown to make individuals of non-mustelid mammals more susceptible to environmental stressors such as adverse weather, food shortages, and predation (Erickson and Urban 2004, p. 99; Jaques 1959, p. 851; Cox and Smith 1992, p. 169; Brakes and Smith 2005, p. 121; LaVoie 1990, p. 29), potentially predisposing individuals to death from other causes. However, there is wide variability in lethal and sublethal levels of ARs exhibited among and within taxonomic groups (Gabriel *et al.* 2012, p. 11), and it is unknown if stressors or injuries could predispose all species to elevated mortality rates (e.g., Gabriel *et al.* 2012, p. 10 for fishers). While it is possible that these effects could occur for coastal martens, the best available data at this time do not support a conclusion that the cumulative effects of rodenticides (which may occur at relatively few sites within the extant population areas and thus reduce likelihood of exposure) combined with other environmental stressors rise to the level of a threat to the DPS overall. Relatively few

marijuana grow sites have been found within the extant population areas (which reduce likelihood of exposure), there are too few samples to determine coastal marten exposure rates to ARs, and no tests have been conducted on martens to determine sublethal exposure rates and effects. Furthermore, none of the data available (related to exposure and potential lethal or sublethal effects) demonstrate an effect leading to current or future population declines.

Vegetation management activities that reduce the shrub layer that coastal martens rely on could also provide increased suitable habitat for marten predators, such as bobcats, resulting in potential increased levels of predation on coastal martens. In general, however, we expect such vegetation management activities would be restricted primarily to private lands. As discussed above (see *Summary of Species Information*, above), the majority of the area known to be occupied by coastal martens is composed of Federal lands, and most of these Federal lands are in reserves managed under the standards and guidelines of the NWFP. As these areas are under management for the protection or enhancement of late-successional forest characteristics, we do not expect extensive management activities on these lands to reduce shrub densities and thus potentially result in increased abundance of intraguild predators. Reduced shrub densities as a result of vegetation management on private lands may pose an increased risk of predation to individual coastal martens seeking to disperse through such areas, which poses some challenges in terms of maintaining or developing connectivity between populations. Although a potential reduction in the complexity of herb and shrub layers on these private lands is likely to continue and thus potentially result in increased suitable

habitat for marten predators, these vegetation changes are expected to be offset by the continued maintenance and enhancement of significant portions of suitable habitat on forested reserves throughout the range of the coastal marten. Thus, at this time, cumulative effects of potential vegetation management activities and predation do not rise to the level of a threat to the DPS overall.

In summary, the best available scientific and commercial data at this time do not show that combined impacts of the most likely cumulative impact scenarios are resulting in significant individual- or population-level effects to the coastal marten, including when taking into consideration small population size, where known. Although all or some of the stressors could potentially act in concert as a cumulative threat to the coastal marten, there is ambiguity in either the likelihood or level of impacts for the various stressors at the population or rangewide level, or the data indicate only individual-level impacts. There is little doubt that coastal marten populations today are smaller and their range has been reduced compared to historical conditions, which potentially increases the vulnerability of the coastal marten to potential cumulative low- or medium-level impacts. However, the best available information does not provide reliable evidence to suggest that current coastal marten populations are experiencing population declines or further reductions in distribution, which would be indicative of such impacts. Thus, the best available scientific and commercial data do not indicate that these stressors (including consideration of effects associated with potentially small or isolated populations, to be conservative) are cumulatively causing now or will cause in the future a substantial decline of the total extant populations of the coastal marten across its range. Therefore,

we have determined that the cumulative impacts of these potential stressors do not rise to the level of a threat.

Conservation Efforts

The Humboldt Marten Conservation Group (HMCG) was formed in 2011, with the primary goal of developing a conservation assessment and strategy for the [then described] Humboldt marten subspecies (*Martes americana humboldtensis*) in coastal northern California. A memorandum of understanding (MOU) was signed on September 26, 2012, between the Service, Six Rivers National Forest, the U.S. Forest Service Pacific Southwest Research Station, Redwood National and State Parks, California Department of Fish and Wildlife (CDFW; formerly California Department of Fish and Game (CDFG)), California Department of Parks and Recreation (CDPR), the Yurok Tribe, and the Green Diamond Resource Company (Service 2012, entire). Each signatory party designated two or more members to provide input to the conservation assessment and strategy, and to guide future implementation of priority conservation actions, irrespective of land ownership. In January 2014, an Oregon stakeholder group was formed to work with the HMCG to extend conservation efforts for the coastal marten into Oregon. This informal group includes participation from Federal, State, timber, and tribal interests.

The HMCG is cooperatively developing a conservation strategy to address coastal marten population and habitat needs across its range, including the goal of increasing the abundance and distribution of coastal martens through habitat retention, habitat

restoration, and establishment of additional populations within their historical range. The strategy uses strategic habitat conservation and adaptive management principles, and will identify necessary permits and compliance needs well in advance of the need for such authorization. Each party seeks input and support from scientific and technical support staff within their agencies or organizations for the entire HMCG to consider for integration in overall planning, implementation, analysis, and monitoring efforts collectively found to be necessary for the conservation of coastal marten and its habitat. It is not the intent of the conservation strategy to supplant any ongoing and planned conservation efforts by the individual parties; instead, the conservation strategy intends to identify opportunities to enhance those conservation efforts. The HMCG holds quarterly meetings to facilitate completion and implementation of the conservation strategy. The California component of the conservation strategy is estimated to be completed in the spring of 2015, followed by the Oregon component in late 2015 or early 2016. A final conservation strategy for both states (as a single coastal marten conservation strategy) is estimated to be completed in 2016.

Tribes that own or manage lands within the historical range of the coastal marten (and may or may not have currently suitable coastal marten habitat on their lands) include: Coquille Indian Tribe; Confederated Tribes of Grand Ronde Community of Oregon; Confederated Tribes of Siletz Indians of Oregon (Siletz Indians); Hoopa Valley Tribe, California; Yurok Tribe of the Yurok Reservation, California (Yurok Tribe); Wiyot Tribe, California; Karuk Tribe; Elk Valley Rancheria, California; Smith River Rancheria, California; Resighini Rancheria, California; Big Lagoon Rancheria,

California; Cher-Ae Heights Indian Community of the Trinidad Rancheria, California; Blue Lake Rancheria, California; Bear River Band of the Rohnerville Rancheria, California; Cahto Tribe of the Laytonville Rancheria; Sherwood Valley Rancheria of Pomo Indians of California; and Manchester Band of Pomo Indians of the Manchester Rancheria, California.

Although suitable habitat for coastal martens may occur on tribal lands, our records indicate that none of the tribes in coastal Oregon or in coastal northern California specifically manage for coastal marten populations or habitat on their lands. However, the Siletz Indians manage 1,700 ha (4,300 ac) of forest land for the benefit of marbled murrelets (*Brachyramphus marmoratus*) in Oregon, which coincidentally may also provide suitable habitat for coastal martens, and the Yurok Tribe is a member of the HMCG and currently owns approximately 23 percent of the total area of the coastal northern California population area, most of which is occupied by coastal martens. The best available information does not identify what the Yurok Tribe's vegetation management activities or potential impacts may be to coastal martens and their habitat. However, we will continue to work with the Yurok Tribe, including through the HMCG, and explore potential coastal marten conservation actions on their lands. We also anticipate coordinating with other tribes that may harbor suitable coastal marten habitat within the range of the coastal marten.

In addition to conservation actions either planned or already being implemented related to the HMCG and tribal efforts, the Green Diamond Resource Company's

(formerly Simpson Timber Company) 1992 Northern Spotted Owl Habitat Conservation Plan (HCP) (Simpson Timber Company 1992, entire) covers lands that contain suitable habitat for coastal marten. This HCP describes how Green Diamond Resource Company identifies (during planning for timber harvest) ways to retain resource attributes that provide core habitat for future northern spotted owl habitat, including retention of: (1) Hardwood and conifer patches, (2) habitat structure along watercourses, (3) hard and soft snags, (4) standing live culls (i.e., trees of marketable size that are useless for all but firewood or pulpwood because of crookedness, rot, injuries, or damage from disease or insects), and (5) small areas of undisturbed brush (Simpson Timber Company 1992, entire). These HCP goals coincidentally will provide a benefit to coastal martens that may occur on those lands. However, we note that the level and extent of resource retention are not defined, and the current description to retain "small areas of undisturbed brush" is helpful, but not necessarily adequate for the needs of the coastal marten (i.e., management relies primarily on clear cut management of timberlands). The Green Diamond Resource Company is in the initial stages of developing a new HCP for their lands, although currently the coastal marten is not a covered species. Because 11 percent of the coastal northern California extant population area is on Green Diamond Resource Company timberlands, we are currently working with them to incorporate conservation actions into the HCP that would benefit the coastal marten and its habitat, particularly in those areas that lie between large suitable tracks of public lands.

Finding

As required by the Act, we considered the five factors in assessing whether the coastal marten is an endangered or threatened species throughout all of its range. We examined the best scientific and commercial data available regarding the past, present, and future stressors faced by the coastal marten. We reviewed the petition, information available in our files, and other available published and unpublished information, and we consulted with recognized marten and habitat experts, and other Federal, State, and tribal agencies. Listing is warranted if, based on our review of the best available scientific and commercial data, we find that the stressors to the coastal DPS of the Pacific marten are so severe or broad in scope as to indicate that the coastal marten is in danger of extinction (endangered), or likely to become endangered within the foreseeable future (threatened), throughout all or a significant portion of its range.

For the purposes of this evaluation, we are required to consider potential impacts to coastal martens into the foreseeable future. Based on the best available scientific and commercial information and to provide the necessary temporal context for assessing stressors to coastal martens, we determined 15 years (i.e., 3 marten generations) to be the foreseeable future for consideration of most of the stressors to coastal marten, as this period allows for analysis of multiple generations of coastal martens over a reasonable time period, as opposed to examining further into the future where assumptions or extensive uncertainty would not allow meaningful predictions of potential future impacts. For two stressors, we have defined different periods: 30 years constitutes the foreseeable future over which we assessed the stressor of wildfire (based on the expected future equivalent level of fire frequency, size, and severity as compared to the past 30 years),

and 40–50 years constitutes the foreseeable future over which we assessed the stressor of climate change (based on model projections of climate changes for coastal Oregon and coastal northern California).

We evaluated each of the potential stressors in the Species Report (Service 2015, entire) for the coastal DPS of Pacific marten, and we determined that wildfire (Factor A), habitat impacts due to the effects of climate change (Factor A), vegetation management (Factor A), development (Factor A), trapping (for fur and research purposes) (Factor B), disease (Factor C), predation (Factor C), collision with vehicles (Factor E), exposure to toxicants (Factor E), and small and isolated population size effects (Factor E) are factors that have either minimally impacted individuals in one or more of the populations or that may potentially have impacts on individuals or populations in the future. Our analysis resulted in the following conclusions for each of the stressors:

- Wildfire impacts are likely to occur throughout the range of the coastal marten similar to the historical impacts that have occurred based on the impact level estimates of the prevalence of wildfires within each extant population area between 1984–2012 (roughly 30 years). Overall, these impacts do not rise to the level of a threat based on the continued persistence of moderate- and high-quality habitat following past fires, the continued presence of relatively moist habitat conditions (overall) that moderate the dry conditions that promote fire ignition and spread, and little effect of altered structure or composition of the dominant forest types in areas that have experienced fire suppression. Thus, we do not anticipate a significant reduction in suitable habitat for coastal martens as the

result of wildfire.

- Climate change modeling predicts a range of potential effects on vegetation, including some that indicate conditions could remain suitable for coastal martens in portions of the coastal range. The severity of potential impacts to coastal marten habitat will likely vary across the range, with effects to coastal martens potentially ranging from negative to neutral or potentially beneficial. Although many climate models generally agree about the changes in temperature and precipitation, the consequent effects on vegetation are more uncertain, as is the rate at which any such changes might be realized. Therefore, it is not clear how or when changes in forest type and plant species composition will affect the distribution of coastal marten habitat. There is additional uncertainty as to fine-scale features of suitable marten habitat that may be affected by climate change, whether any changes will occur at a scale relevant to the taxon, and how these changes will be expressed in the coastal marten populations. Overall, we lack sufficient information to predict with any certainty the future direct impacts of climate change on coastal marten habitat or populations. Consequently, we have determined that we do not have reliable information to suggest that climate change is a threat to coastal marten habitat now or in the future, although we will continue to seek additional information concerning how climate change may affect coastal marten habitat.
- Vegetation management is likely to have an overall low impact on the loss, degradation, or fragmentation of suitable coastal marten habitat across the range of the DPS both currently and into the future. Some loss of suitable habitat

(primarily low-quality suitable habitat) is expected to continue to occur into the future on private lands within all three population areas. However, private lands support a relatively small proportion of the suitable habitat available for coastal martens within extant population areas. Federal lands constitute a majority of the extant population areas, have longer timber-harvest rotations, and retain more structural features on the subset of that area in matrix lands. In addition, most of the Federal lands that provide suitable habitat are in Federal Reserves, which are managed for the maintenance and recruitment of late-successional habitat characteristics beneficial for coastal martens; suitable habitat is thus expected to increase in Federal Reserves. Therefore, overall potential impacts from vegetation management do not rise to the level of a threat.

- Development has an overall low impact on the loss, degradation, or fragmentation of suitable coastal marten habitat across the range of the DPS both currently and into the future, and thus does not rise to the level of a threat. If development does occur, loss of suitable habitat is expected to be minimal, as has been the trend over the past 30 years.
- Fur trapping of coastal martens has no impact to the population in coastal northern California because trapping for martens is illegal in California. Possible illegal fur trapping in California, as well as rangewide potential impacts associated with livetrapping for research purposes or incidental trapping of martens (when intentionally trapping for other furbearer species) is not expected to result in population-level impacts. Some martens could be trapped in Oregon where fur trapping for martens is legal, although we estimate that potential

impacts will not be significant at the population- or rangewide level based on the best available trapping data for Oregon. Additionally, potential impacts from live-trapping and handling for research purposes on coastal marten populations is discountable. Thus, impacts from fur trapping and trapping for research purposes across the coastal marten's range do not rise to the level of a threat.

- Disease has not been documented in the past within coastal marten populations. The prevalence of possible past exposure to lethal pathogens within the coastal northern California population and the coastal Oregon populations has not been determined, and we have no information to suggest that disease is currently present in any of the populations. At this point in time, there is a low probability that a disease outbreak may occur. We anticipate that if there should be an outbreak, it would likely have a low impact on all three coastal marten populations combined since the distance between the extant populations makes it unlikely that an outbreak would spread to all three populations. Thus, disease does not rise to the level of a threat.
- Predation is a natural process and is generally only considered a threat if it is occurring at unnaturally high levels that are not sustainable. The population-level impact of predation within the three coastal marten extant population areas is currently unknown, although the best available data from one evaluation of predation indicate a 33 percent annual predation rate for the coastal northern California population (Slauson *et al.* 2014, unpubl. data). This level of predation is expected to be sustainable when compared with the observed annual juvenile coastal marten survival rate of 50 percent, and thus predation alone would not

likely result in a population-level impact. Therefore, based on the best available data at this time, we have determined that predation does not rise to the level of a threat given that it is a natural phenomenon that appears to be occurring at a sustainable level.

- Collisions with vehicles are rare, but they can be expected into the future. Known rates of mortality due to collisions with vehicles have been low for coastal martens, and the best available information does not suggest any significant increases in vehicular traffic or new highways to be built in areas where martens occur. Therefore, it is reasonable to expect the impact of collisions with vehicles on coastal martens to continue at similar levels into the future and not rise to the level of a threat.
- Illegal and legal marijuana cultivation sites (and use of ARs and other pesticides) are present within or near all three coastal marten populations, although the probability of exposure varies between them. The degree of exposure and the effect of such exposure on coastal martens, should it occur, is unknown and thus far unstudied. There is significant uncertainty as to the severity of impact that this stressor may have on coastal martens at the population- and rangewide levels given that the best available data are minimal regarding this stressor and coastal martens at this time, and given the lack of information regarding potential sublethal effects. Furthermore, it is unclear how the recent legalization of marijuana in Oregon will affect the amount or spread of illegal marijuana grow sites. The best available information does not suggest that these potential impacts rise to the level of a threat, primarily based on the available information on levels

of known marten exposure to ARs and lack of evidence that ARs are having a population-level effect.

- Small, isolated populations are more susceptible to impacts, and therefore, we evaluated whether coastal marten populations are small and isolated such that these negative effects are likely to be realized. At this time, evidence suggests that coastal marten distribution has contracted markedly in California and southern Oregon since the early 20th century. Although the coastal northern California population abundance declined in the recent past (based on survey data between 2000 and 2008 (Slauson *et al.* 2009b, p. 10)), the population abundance since that time appears to have remained unchanged as indicated by the most recent preliminary abundance estimates available from 2012. The abundance and trend of coastal marten populations in coastal Oregon is unknown, although recent surveys in some areas of coastal Oregon (which are not yet complete) are documenting the presence of martens as anticipated. Although the known populations are disjunct, the dispersal capabilities of martens and habitat modeling suggest the potential for interchange of individuals between the populations. In addition, martens may occur between or adjacent to the known populations in areas where surveys have been limited or absent. The best available data at this time indicate that although coastal martens are likely reduced in abundance or distribution relative to their historical numbers and range, there is no empirical evidence that any current populations of coastal marten are in decline. Thus, small or isolated population size effects do not rise to the level of a threat either currently or in the foreseeable future.

- Potential cumulative impacts to the coastal marten from all stressors combined or some of the stressors are possible; however, the most likely scenarios for cumulative impacts are likely to only occur from the following three scenarios: increased frequency or size of wildfires associated with potential climate changes; increased coastal marten mortality rates from predation, disease, or other factors following a sublethal exposure to toxicants; or possible increased coastal marten predation rates due to decreased shrub densities resulting from vegetation management activities. Based on the best available data at this time and as described above, none of these possible cumulative impacts are likely to occur currently or into the foreseeable future to such a degree that the effects are expected to lead to population- or rangewide-level declines. Therefore, the cumulative impact of these potential stressors does not rise to the level of a threat.

We also evaluated existing regulatory mechanisms (Factor D) and did not determine an inadequacy of existing regulatory mechanisms for coastal marten. Specifically, we found that multiple Federal land use plans (e.g., LRMPs, NWFP) or State regulations (e.g., Oregon forest practice rules) are being implemented, often providing broad latitude for land managers, but with explicit sideboards for directing management activities. We also note that significant Federal efforts have been developed and are being implemented (e.g., NWFP) to abate the large-scale loss of forested habitat-types deemed essential for coastal martens. Additional efforts are also underway within the reserve areas that constitute a majority of the Federal lands in areas occupied by coastal martens to promote further recruitment of such habitat.

None of these impacts, as summarized above, was found to individually or cumulatively impact the coastal DPS of Pacific marten to a degree such that listing is warranted at this time. Based on the analysis contained within the Species Report (Service 2015, pp. 41–95), we conclude that the best available scientific and commercial information indicates that these stressors are not singly or cumulatively causing a decline of the DPS or its habitat currently, nor are the stressors likely to be significant in the foreseeable future to the degree that they would result in declines of one or more populations such that the DPS would be in danger of extinction, or likely to become so within the foreseeable future.

We base our decision on the following:

(1) Although habitat-based impacts may be occurring currently or in the future primarily as a result of wildfire and vegetation management (and, to an unknown degree, the effects of climate change), much of the coastal marten's habitat is not in especially fire-prone forest types, and vegetation management has significant impacts only on the relatively small area in private ownership within its range. Significant amounts of moderate- and high-suitability habitat are currently available on Federal and State lands within all three population areas, including approximately 44 percent of the coastal central Oregon population area, 70 percent of the coastal southern Oregon population area, and 63 percent of the coastal northern California population. Moderate- and high-suitability habitat in the coastal central Oregon population area is a currently

undetermined value greater than 44 percent because the habitat suitability model did not account for occupied coastal dune habitat that exists as a narrow coastal strip along the western boundary of that population area. Overall, the existing moderate- and high-suitability habitat includes some areas that appear to be either (or both): (a) Resilient to many high-severity fires due to pronounced levels of precipitation and cool, moist summer conditions that exist along the coast currently and into the future; and (b) protected from significantly damaging treatments of vegetation management (i.e., State and Federal lands such as those being managed under the NWFP, National Park Service lands, and lands managed by the Oregon and California Department of Parks and Recreation), including 77 percent of the moderate- and high-suitability habitat in the coastal central Oregon population area, 90 percent of the moderate- and high-suitability habitat in the coastal southern Oregon population area, and 78 percent of the moderate- and high-suitability habitat in the coastal northern California population area.

(2) Coastal marten populations throughout their range have likely experienced declines or significant impacts in the past (i.e., harvesting and trapping for fur), which undoubtedly influenced the current distribution of these populations. The population size of coastal martens in the coastal northern California population area is estimated to be fewer than 100, but is no longer in decline as shown by survey data available from 2000, 2008, and preliminary abundance estimates from 2012. The abundance and distribution of coastal martens in coastal Oregon is unknown, coastal northern Oregon is unsurveyed, and there are no data available on which to estimate any trend in known populations in coastal central and coastal southern Oregon. We presume that coastal marten populations

may not be especially large or expansive, given the historical impacts of overtrapping and timber harvest. However, these past threats have been largely ameliorated, and we have no evidence to suggest that current stressors are resulting in any population declines, such that we would consider the DPS of coastal marten to be on a trajectory toward extinction. We thoroughly evaluated impacts to the DPS and its habitat with regard to the five listing factors. Similar to the stressors described in (1) above for potential impacts to habitat, we found minimal evidence of population-level impacts.

We recognize a need to continue to monitor the coastal marten because the populations are disjunct, which in general makes them more susceptible to stressors than species with larger, more well-connected populations. There has been relatively little survey effort throughout much of the range of the DPS, however. In general, the interchange of only a few individuals is needed to maintain genetic connectivity between populations over time. As described in this document and the Species Report (Service 2015, entire), there are stressors that we find may be having some effect on coastal marten populations, albeit not to the degree that they currently rise to the level that listing is warranted. We will continue to monitor the status of the DPS and evaluate any other information we receive. Additional information will continue to be accepted on all aspects of the DPS. If at any time data indicate that protective status under the Act should be provided or if there are new threats or increasing stressors that rise to the level of a threat, we can initiate listing procedures, including, if appropriate, emergency listing pursuant to section 4(b)(7) of the Act.

In conclusion, we acknowledge that the coastal marten population in California may be reduced in size relative to its historical abundance, and that coastal martens may be reduced in distribution as compared to their historical range. A listing determination, however, must be based on our assessment of the current status of the species—in this case, the coastal DPS of the Pacific marten—in relation to the five listing factors under the Act. Section 4 of the Act requires that we make such a determination based solely on the best scientific and commercial data available. To this end, we must rely on reasonable conclusions as supported by the best available science to assess the current and future status to determine whether the coastal marten meets the definition of an endangered or threatened species under the Act. Based on our review of the best available scientific and commercial information pertaining to the five factors, we find that the stressors acting upon the coastal DPS of the Pacific marten are not of sufficient imminence, intensity, or magnitude to indicate that the coastal marten is in danger of extinction now (endangered), or likely to become endangered within the foreseeable future (threatened), throughout all of its range.

Significant Portion of the Range

Under the Act and our implementing regulations, a species may warrant listing if it is an endangered or a threatened species throughout all or a significant portion of its range. The Act defines "endangered species" as any species which is "in danger of extinction throughout all or a significant portion of its range," and "threatened species" as any species which is "likely to become an endangered species within the foreseeable

future throughout all or a significant portion of its range." The term "species" includes "any subspecies of fish or wildlife or plants, and any distinct population segment [DPS] of any species of vertebrate fish or wildlife which interbreeds when mature." We published a final policy interpreting the phrase "Significant Portion of its Range" (SPR) (79 FR 37578; July 1, 2014). The final policy states that (1) if a species is found to be an endangered or a threatened species throughout a significant portion of its range, the entire species is listed as an endangered or a threatened species, respectively, and the Act's protections apply to all individuals of the species wherever found; (2) a portion of the range of a species is "significant" if the species is not currently an endangered or a threatened species throughout all of its range, but the portion's contribution to the viability of the species is so important that, without the members in that portion, the species would be in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range; (3) the range of a species is considered to be the general geographical area within which that species can be found at the time the Service or NMFS makes any particular status determination; and (4) if a vertebrate species is an endangered or a threatened species throughout an SPR, and the population in that significant portion is a valid DPS, we will list the DPS rather than the entire taxonomic species or subspecies.

The SPR Policy is applied to all status determinations, including analyses for the purposes of making listing, delisting, and reclassification determinations. The procedure for analyzing whether any portion is an SPR is similar, regardless of the type of status determination we are making. The first step in our analysis of the status of a species

("species" under the Act refers to any listable entity, including species, subspecies, or DPS) is to determine its status throughout all of its range. If we determine that the species is in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range, we list the species as an endangered (or threatened) species and no SPR analysis is required. If the species is neither an endangered nor a threatened species throughout all of its range, we determine whether the species is an endangered or a threatened species throughout a significant portion of its range. If it is, we list the species as an endangered or a threatened species, respectively; if it is not, we conclude that listing the species is not warranted.

When we conduct an SPR analysis, we first identify any portions of the species' range that warrant further consideration. The range of a species can theoretically be divided into portions in an infinite number of ways. However, there is no purpose to analyzing portions of the range that are not reasonably likely to be significant and either endangered or threatened. To identify only those portions that warrant further consideration, we determine whether there is substantial information indicating that (1) the portions may be significant, and (2) the species may be in danger of extinction in those portions or likely to become so within the foreseeable future. We emphasize that answering these questions in the affirmative is not a determination that the species is an endangered or a threatened species throughout a significant portion of its range—rather, it is a step in determining whether a more detailed analysis of the issue is required. In practice, a key part of this analysis is whether the threats are geographically concentrated in some way. If the threats to the species are affecting it uniformly throughout its range,

no portion is likely to warrant further consideration. Moreover, if any concentration of threats apply only to portions of the range that clearly do not meet the biologically based definition of "significant" (i.e., the loss of that portion clearly would not be expected to increase the vulnerability to extinction of the entire species), those portions will not warrant further consideration.

If we identify any portions that may be both (1) significant and (2) endangered or threatened, we engage in a more detailed analysis to determine whether these standards are indeed met. The identification of an SPR does not create a presumption, prejudgment, or other determination as to whether the species in that identified SPR is an endangered or a threatened species. We must go through a separate analysis to determine whether the species is an endangered or a threatened species in the SPR. To determine whether a species is an endangered or a threatened species throughout an SPR, we will use the same standards and methodology that we use to determine if a species is an endangered or a threatened species throughout its range.

Depending on the biology of the species, its range, and the threats it faces, it may be more efficient to address the "significant" question first, or the status question first. Thus, if we determine that a portion of the range is not "significant," we do not need to determine whether the species is an endangered or a threatened species there; if we determine that the species is not an endangered or a threatened species in a portion of its range, we do not need to determine if that portion is "significant."

We consider the historical range of the coastal marten to include coastal Oregon from the Columbia River (Clatsop and Columbia counties) south into northern Sonoma County, California, including suitable habitat from the coast eastward to an elevation of 1,524 m (5,000 ft). This range encompasses the coastal central Oregon extant population area, the coastal southern Oregon extant population area, the coastal northern California extant population area, and the intervening habitat. Based on the best available information at this time, these populations account for the current distribution of the DPS.

In considering any significant portion of the coastal marten's range, we considered whether the stressors facing the coastal marten might be different at three locations where the coastal martens have been found and, thus, geographically concentrated in some portion of the range of the DPS. In the **Summary of Information Pertaining to the Five Factors** analysis above, we identified the most likely potential differences associated with fur trapping in Oregon, wildfire, climate change, development and vegetation management (timber harvesting), and toxicant exposure.

(1) Fur trapping is legal in Oregon, and thus the two Oregon populations may be affected by this activity. Population-level impacts of legal coastal marten fur trapping within the two Oregon extant population areas have not been studied, as the impact of trapping on a marten population requires an estimate of population abundance, which is currently unavailable for both extant population areas in coastal Oregon. Based on the very few individuals removed from this population over time (36 individuals harvested from trapping over a 26-year period, between 1969 and 1995—on average fewer than 2

per year), the best available data indicate that fur trapping is unlikely to result in population-level impacts.

Fur trapping of martens is illegal in California but legal for other furbearer species. We expect that nearly all coastal martens that are accidentally captured in box traps set for other furbearer species (or that are live-trapped for research purposes) are released unharmed. Although illegal fur trapping specifically for martens is also a possibility in California, the best available data at this time do not indicate that illegal fur trapping or incidental legal live-trapping for coastal martens for research purposes is resulting in population-level impacts. Overall, we do not find that the potential impacts from fur trapping (illegal or legal) and live-trapping for research purposes are geographically concentrated in any one portion of the range of the DPS.

(2) The potential impacts from wildfire are slightly greater within the coastal southern Oregon and coastal northern California populations as compared to the coastal central Oregon population when considering historical (between 1984 and 2012) wildfire incidents and the likelihood that into the foreseeable future (approximately 30 years), the frequency, intensity, and severity of wildfires are expected to be similar to the recent past. However, these wildfires in coastal southern Oregon and coastal northern California have burned at varying levels of severity and have thus only partially impacted (i.e., not completely removed) suitable habitat and the adjacent, intervening suitable habitat that the coastal marten would need to rely on during post-fire habitat recovery periods. Surveys of these areas (including the drier, inland, xeric areas) post-burn

indicate that low-, moderate-, and high-suitability habitat remain within and adjacent to these past wildfire perimeters. Therefore, although future wildfires are expected to occur similarly to those documented in the past 30 years throughout the coastal marten's range (i.e., among all three extant population areas), and given the potential for increased temperatures and decreased precipitation over the next 50 years (see "Climate Change" under *Factor A*, above) throughout its entire range, we do not anticipate a concentration of threats in any one portion of the DPS' range due to:

(a) The coastal marten's range continuing to occur within a (generally) fog-influenced coastal zone, and thus the continued widespread presence of persistent, moist conditions year-round (including Pacific storms in the winter and cloud cover or coastal fog in the summer) that likely result in lower severity wildfires than what would occur in areas without the a moist, coastal influence; and

(b) The anticipated widespread presence of varying levels of suitable habitat post-fire throughout the coastal marten's range, as demonstrated by post-burn surveys.

(3) The potential impacts from climate change are slightly greater within the coastal southern Oregon and coastal northern California populations, which models indicate could result in a warmer and drier climate into the foreseeable future (40 to 50 years) as compared to the coastal central Oregon population. Nearly all models that encompass the landscape containing these two population areas show shifts in vegetation type to habitat that may be considered less favorable for coastal martens. However, most models project these shifts in vegetation type over time by the end of the century, and the models predict these same potential vegetation shifts in coastal central and northern

Oregon. Additionally, even if vegetation shifts occur, suitable habitat for coastal martens is expected to remain in portions of the coastal southern Oregon and coastal northern California population areas, to which coastal martens could migrate (see Climate Change, above). Overall, we do not anticipate a geographic concentration of threats in any one portion of the DPS' range given the variety of potential effects from climate change, the high level of uncertainty regarding the nature and timing of any such effects, and the likelihood that suitable habitat for coastal martens will remain available into the foreseeable future throughout the entire range of the DPS despite potential climate change impacts.

(4) Both development (e.g., road building, dam construction and creation of new reservoirs, conversion of forest habitat for agricultural use, development and expansion of recreational areas) and vegetation management (e.g., timber harvest, thinning, fuels reduction) are expected to continue on some private lands throughout the range of the coastal marten. These activities potentially may occur to a greater extent in the coastal central Oregon population area as compared to the coastal southern Oregon and coastal northern California population areas due to the greater percentage of moderate- and high-suitability marten habitat in private ownership in the coastal central Oregon population area (i.e., 23 percent as opposed to 10 percent and 11 percent, respectively). However, the best available data do not indicate that either potential development activities or vegetation management in one or more of these population areas will occur at a level greater than any other (i.e., the potential impacts are uniformly distributed throughout the DPS's range). Additionally, the best available data do not indicate that any new

development or vegetation management activities (i.e., those that would remove currently suitable habitat) would occur into the foreseeable future to such a degree that population-level impacts are likely. We have made this conclusion primarily based on the extensive amount of Federal lands both within and adjacent to all three populations where overall beneficial vegetation management (such as that outlined in the NWFP) would occur, thus providing an overall conservation benefit to coastal marten rangewide.

Some vegetation management activities may also occur throughout the coastal marten's range that may result in short-term impacts to coastal marten (such as thinning, fuels reduction projects, and habitat restoration), but eventually result in long-term benefits to coastal martens and their habitat. In these cases, the long-term benefits likely outweigh the potential short-term, localized impacts by improving habitat suitability for the coastal marten in the long-term through: (a) Minimizing loss of late-successional stands due to wildfires, and (b) accelerating the development of late-seral characteristics. Although short-term degradation of suitable habitat could occur, these types of projects are designed to ultimately increase the overall amount, distribution, and patch size of suitable coastal marten habitat.

(5) Potential exposure of coastal martens to toxicants as a result of illegal marijuana cultivation sites is likely to continue on some lands within the coastal marten's range. This type of activity could potentially occur in those areas where marijuana grow sites are located (which currently is known to be a fraction of the coastal marten's range). Based on the presence of suitable climate conditions for marijuana cultivation and data

that indicate a greater concentration of recently eradicated cultivation sites within or near the coastal northern California population area, these activities may possibly occur to a greater extent in the coastal northern California population area as compared to the coastal Oregon population areas. Of note is that incidence of toxicant exposure and the potential population-level effects to coastal marten are largely unknown, and there is significant uncertainty as to the severity of impact (both lethal and sublethal) that this stressor may have at the population- and rangewide levels on coastal marten, especially given the recent legalization of marijuana in Oregon (note that marijuana is not legal in California). The best available data indicate broad use of ARs at illegal marijuana cultivation sites, as well as continued use of ARs at legal grow sites, both of which are found within the range of the DPS, but the degree of exposure that may result for coastal martens is unknown. To date, only one record of a positive exposure exists within the range of the coastal marten that demonstrates exposure to ARs. Therefore, at this time, the best available data do not indicate that the coastal marten's exposure to ARs will occur at a level greater than any other in any one portion of the range of the DPS.

In summary, our evaluation of the best available information indicates that the overall level of stressors is not geographically concentrated in one portion of the coastal marten's range, and that the stressors that have the potential to impact coastal martens are relatively consistent across its range (Service 2015, entire). Therefore, it is our conclusion, based on our evaluation of the current potential threats to the coastal marten (see **Summary of Information Pertaining to the Five Factors** section of this finding and the "Stressors on Coastal Marten Populations and Habitat" section of the Species

Report (Service 2015, pp. 41–95)), that no portion of the range of the coastal DPS of Pacific marten warrants further consideration of possible endangered or threatened status under the Act.

Our review of the best available scientific and commercial information indicates that the coastal marten is not in danger of extinction (endangered) nor likely to become endangered within the foreseeable future (threatened), throughout all or a significant portion of its range. Therefore, we find that listing the coastal DPS of the Pacific marten as an endangered or threatened species under the Act is not warranted at this time.

We request that you submit any new information concerning the status of, or threats to, the coastal marten to our Arcata Fish and Wildlife Office (see **ADDRESSES**) whenever it becomes available. New information will help us monitor coastal martens and encourage their conservation. If an emergency situation develops for the coastal marten, we will act to provide immediate protection.

References Cited

A complete list of references cited is available on the Internet at *http://www.regulations.gov* and upon request from the Arcata Fish and Wildlife Office (see **ADDRESSES**).

Authors

The primary authors of this document are the staff members of the Pacific Southwest Regional Office.

Authority

The authority for this section is section 4 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.).

Dated: March 30, 2015

Robert Dreher,

Acting Director, U.S. Fish and Wildlife Service

[FR Doc. 2015-07766 Filed: 4/6/2015 08:45 am; Publication Date: 4/7/2015]